

Gazetteer of Bombay State

(Revised Edition)



GENERAL SERIES—VOLUME A

BOTANY

Part II—Timbers

सत्यमेव जयते

(Under Government Orders)

BOMBAY

PRINTED AT THE GOVERNMENT CENTRAL PRESS

Obtainable from the Government Publications Sales Depot, Institute of Science Building, Fort, Bombay (for purchasers in Bombay City), from the Government Book Depot, Charni Road Gardens, Bombay 4 (for orders from the mofussil), or through the High Commissioner for India, India House, Aldwych, London, W.C.2, or through any recognized Bookseller.

Price—Rs. 4 As. 3 or 7s.

1957

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PREFACE

Volume XXV of the "Gazetteer of the Bombay Presidency" was devoted to Botany and was published in 1886. It contained three articles, viz. :—

- (1) Useful Plants of the Bombay Presidency—by J. C. Lisboa ;
- (2) Botany of the Bombay Presidency—by Surgeon Major W. Grey ; and
- (3) List of Gujarat Trees, compiled from materials supplied by G. H. D. Wilson and Lt.-Col. J. G. McRae.

In this revised edition, the information given in all these articles has been brought up to date ; articles (1) and (3) have been recast and arranged into three Parts, viz., I—Medicinal Plants, II—Timbers, and III—Miscellaneous Plants, Trees, Shrubs, Herbs, etc. ; and article (2) has been entirely re-written under the heading "Vegetation of the Bombay State" and arranged as Part IV.

Dr. S. P. Agharkar, M.A., Ph.D., F.L.S., F.N.I., Professor of Botany (Retired), Calcutta University, has been in charge of the preparation of these Parts under the direction of the Bombay District Gazetteers (Revision) Editorial Board.

Part I, dealing with Medicinal Plants, was published in May 1953. This Part, which deals with Timbers, is also being published separately for the convenience of the public. Not only has additional information been given about all the Timbers listed in the old gazetteer but a large number of new Timbers and even woody plants have been added to the list.

M. R. PALANDE,
Executive Editor and Secretary,
Bombay District Gazetteers (Revision)
Editorial Board.

August 1956.

PART II.—TIMBERS*.

ACACIA ARABICA Willd.

FAM.—Mimosaceæ.

COM. NS.:—*E. Babul*, Indian Gum Arabic; *H. Babul*, Babus; *K. Gobli*, Jali, Jaligida; *M. Babbul*, Babul; *Tr. Babul*.

CHAR.:—A moderate-sized or a large tree. *Bark* dark-brown or black, longitudinally fissured. *Branches* thorny. *Spines* 6-5 cm. long, large, white, often with brown points, straight, somewhat ascending. *L.*—rachis downy with several cup-shaped glands; *pinnæ* generally 6-12, 1.3-4 cm. long; leaflets 20-40, linear, membranous, 6 cm., glabrous or downy. *Fl.*—yellow, in globose heads. *Peduncles* slender, grey-downy, with bracts in the middle, 3-6 fasciculate. *Corolla* campanulate, twice the length of the calyx. *Fr.*—pod, coriaceous, densely grey-downy, stalked, 7.5-10 cm. \times 1.3 cm. moniliform, 8-12 seeded. *Fl. t.*—June-Jan. (rainy season). *Fr. t.*—cold season.

There are two varieties. *Var. cupressiformis* Stew—branches erect, like a cypress in growth, called *Ram-Kanta*. *Var. vediana*—bark more deeply cracked, crown formed of twisted angular branches; spine white; stout; pods flat, called *Vedi-babul*.

DISTR.:—Throughout the dry districts of the State; forms extensive forests in the black-soil country of the State proper. Indigenous in Gujarat and N. Deccan, Punjab, Bihar, Rajasthan, Western Peninsula, Ceylon, Arabia, Egypt, Tropical Africa, Natal.

DESCR. OF WOOD:—*Colour*—sap-wood large, whitish; heart-wood pinkish white, turning reddish-brown on exposure; mottled with dark streaks. *Pores* moderate-sized, sometimes large, oval and sub-divided in patches of pale loose tissue, which are occasionally confluent in more or less regular but usually interrupted concentric rings. *Med. rays* fine and moderately broad, short, numerous, unequally distributed, conspicuous on a radial section. Hard, very durable (sap-wood not durable); has a very good shock-resisting ability; air-seasons with fairly good results; kiln-seasons with difficulty. Easy to convert and saw very green; finishes to a good surface, takes a fair polish, but requires careful filling. *Wt.*—54 lbs. per c. ft.

USES:—Wood used for house-building, carts, carriages and their parts, boat-building and their parts, sugar and oil-presses, rice-pounders, agricultural implements, Persian wheels, well curbs, cooper's work, packing for buffers of railway rolling stock, carving and turning including carved dies for cloth stamping. Good fuel, gives good charcoal. Gum from bark is largely collected. Branches, leaves and pods are fed to cattle, sheep and goats. Thorny branches used to fence fields. Tree sometimes used for rearing *lac* insects.

See—Medicinal Plants, Gums and Resins, Dyes and Tans, Folder Plants, Famine Plants.

*Woody Plants are also included in this Part.

ACACIA CHUNDRA Willd.

(ACACIA SUNDRA DC.)

FAM.—Mimosaceæ.

COM. NS.:—*E.* Black or Pegu Catcchu, Catechi, Cutch; *G.* Kher, Khairiobavel; *H.* Katha, Khair, Khair-babul; *K.* Kachu. Kaggali, Kaggali-shami, Tare; *M.* Khair, Lal-Khair.

CHAR.:—A moderate-sized tree, trunk short, 9-12 m. high; girth 1·2-3 m. *Bark* dark-grey or greyish-brown exfoliating in long narrow strips. *Spines* short, hooked, twin, brown, infra-petiole. *L.*—rachis glabrous about 15 cm. long, often with scattered prickles and a gland below the insertion of the pinnæ and smaller ones between several of the upper pinnæ. Pinnæ 15-20, leaflets 40-80, very close, ligulate. *Fl.*—pale-yellow in solitary or fascicled, axillary, 7·5-10 cm. long spikes. Petals linear, glabrous, three times longer than the glabrous calyx. *Fr.*—legume, stipitate, strap-shaped, brown, 5·7·5 × 1·3-2 cm 3-10 seeded. *Fl. t.*—Aug.-Sept. *Fr. t.*—Dec.

DISTR.:—Dry open thorn-forests. Common throughout the State along the coasts of Konkan and N. Kanara (often on laterite), Deccan, Khandesh-Akrani, S. M. Country and Gujarat, Rajasthan, W. Peninsula, Himalayas up to 1,700 m., Sikkim: Pegu, Burma, Ceylon.

(This is very common in the Bombay State and has often been recorded as *A. catechu* proper, which is somewhat of doubtful occurrence).

DESCR. OF WOOD:—*Colour*—sap-wood yellowish-white; heart-wood rather dark or light red. *Pores* moderate-sized and large, often sub-divided, occasionally in radial groups of 2 or 3, and surrounded by narrow rings of soft tissue, which are often joined and form interrupted concentric bands; they are frequently filled with a white substance, are fairly uniformly distributed and are distinctly marked on a longitudinal section. *Med. rays* short, moderately broad, numerous, bent where they touch the pores, which are often larger than the space between two med. rays. Very hard; seasons well, takes a fine polish, extremely durable; is not attacked by white ants or by teredo. *Wt.*—63 lbs. per c.ft.

USES:—Wood used for house-posts (very superior), carts and their parts, boat-building, well construction, furniture, agricultural implements, rice-pestles, oil and sugar-cane crushers, tool and sword handles, bows, spear-shafts, hand-loom, combs; probably suitable for paving-blocks; used as fire-wood for steamers in Burma. The chief product of the tree is catechu, an important tan; under careful preparation it is produced in the form of "Kath", and as an astringent for chewing with *betel-pan* and also medicinally.

See—Medicinal Plants, Dyes and Tans.

ACACIA EBURNEA Willd.

FAM.—Mimosaceæ.

COM. NS. :—*H.* Pahari Kikar ; *M.* Marmat.

CHAR. :—A small deciduous tree, 4·2-6 m. high. *Bark* rough, dark-grey. *Spines* 6-5 cm., the long ones ivory-white. *L.*—pinnæ 4-10, with a gland between the lowest pair, and occasionally one between the uppermost : leaflets 12-16, very small, linear, obtuse, coriaceous, grey-green, downy. *Fl.*—heads of flowers yellow, about 1·3 cm. diam. ; peduncles axillary, solitary or several, densely grey-downy with bracts about the middle. Corolla about twice the length of the calyx, tubular. *Fr.*—legume, stalked, 5-15 × ·6 cm., thin, flat, glossy, 6-12 seeded. *Fl. t.*—Nov.-Jany. *Fr. t.*—May-June.

DISTR. :—Throughout the dry Deccan districts, common in S. M. Country in stony places, Eastern Himalayas to W. Peninsula : Sind, Ceylon, Afghanistan, Aden.

DESCR. OF WOOD :—*Colour* yellowish-white, often with red heart-wood. *Pores* moderate-sized and large, often oval and sub-divided into compartments, enclosed in wavy and irregular, concentric bands of soft tissue, which are frequently interrupted ; *Med. rays* fine and moderately broad, wavy, prominent in the bands of darker and finer tissue, which alternate with the soft ones. *Hard.* *Wt.*—52 lbs. per c.ft.

USES :—Wood used for fuel. The tree often has its twigs attacked by fungus in the Poona district which forms swellings (galls) ; these are eaten by poor people.

ACACIA FARNESIANA Willd.

FAM.—Mimosaceæ.

COM. NS. :—*E.* Cassie Flower, Spongy Tree, Stinking Acacia ; *G.* Gandhelokhair, Jheribavul ; *H.* Passibabal, Vilayati Kikar ; *K.* Jali, Karejali ; *M.* Devababhul, Kankri.

CHAR. :—A thorny shrub or a low tree, 6-7·5 m. high ; girth 3-6 m. *Bark* light brown, rough. *Branches* slender, zigzag, marked with grey or pale-brown dots. *Spines* stipular, straight. Common petiole 4-5 cm. *L.*—2-pinnate, 2·5-5 cm. long, pinnæ 4-8 pairs ; cup-shaped glands below the lowest and often at the base of the uppermost pair ; leaflets 10-20 pairs. *Fl.*—bright-yellow, sweet-scented, in globose fasciculate heads. *Fr.*—pod, nearly cylindric, 5-9 cm., turgid, brown, slightly curved, pointed at the ends, dehiscent, glabrous, valves with raised parallel lines. Seeds embedded in dry spongy tissue. *Fl. t.*—Jan.-Mar. *Fr. t.*—in rainy season.

DISTR. :—Cosmopolitan in the tropics, but usually cultivated. Run wild near villages and in moist situations throughout the State ; common in the eastern parts and in black-soil *nalas* of the Deccan. Sind.

DESCR. OF WOOD :—*Colour*—sap-wood white ; heart-wood red, irregular. *Pores* moderate-sized, single or in patches or in concentric

interrupted bands of soft tissue, often filled with resin. *Med. rays* fine, numerous. Very hard, tough. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for ship-keels, tent-pegs, etc. The scented flowers yield an essence on distillation, much used in European perfumery. The perfume is called "Cassie." Trunk exudes a gum collected in Sind. Bark used in medicine, contains about 2 p.c. tannin. Tree makes a good fence.

See—Medicinal Plants, Gums and Resins.

ACACIA FERRUGINEA DC.

FAM.—Mimosaceæ.

COM. NS. :—G. Khaiger ; K. Banni ; M. Pandhra Khair.

CHAR. :—A large deciduous tree, 7·5-12 m. high. *Bark* 1·3 cm. thick, rough, dark coloured. *Spines* short, hooked, twin, infra-petiolary ; sometimes absent. *L.*—rachis with one small circular or linear gland on the common petiole, and one between the uppermost pinnæ. *Pinnæ* 6-12, 5·7·5 cm. long ; leaflets 20-60, glaucous, rigid, subcoriaceous. *Fl.*—yellowish, in dense axillary spikes, 10-12·5 cm. long. *Corolla* very small. *Fr.*—pod, 7·5-10 × 2 cm., dark-brown, glabrous veined, 4-6-seeded, the upper suture narrowly winged. *Fl. t.*—Oct.-Nov. *Fr. t.*—Jan.-Feb.

DISTR. :—Forests of Konkan, Dangs and Gujarat (Panch Mahals). Western Peninsula, N. Bengal, Madhya Bharat.

DESCR. OF WOOD :—*Colour*—sap-wood large, yellowish-white ; heart-wood olive-brown. *Pores* moderate-sized, generally single, in small rounded patches of soft tissue, which are only sometimes confluent. *Med. rays* short, pale, numerous, fine. Very hard, heavy, durable ; polishes well without absorbing much polish. *Wt.*—70 lbs. per c. ft.

USES :—Wood used for buildings, carts, agricultural implements, and well-construction. Bark astringent and is used in the distillation of arrack.

ACACIA LATRONUM Willd.

FAM.—Mimosaceæ.

COM. NS. :—H. Bhes ; K. Donn-mullin, Hod-Jali, Tumbuli ; M. Bhes, Dev-Babhul.

CHAR. :—A glabrous shrub or a small tree, forming an umbrella-like crown when old, armed with twin straight, white, stipular spines, connate at the base, 6-6·5 cm. long. *Bark* dark reddish-brown, very rough, 1·3 cm. thick, vertically cleft. *L.*—often very close with a gland on the glabrous or (sometimes) pubescent petiole. *Pinnæ* 6-10, 2·5 cm., leaflets 20-30, ligulate, glabrous or pubescent, rigid. *Fl.*—fragrant, white, becoming yellow in time, in spikes 2·5-4 cm., arising from the leafless branchlets. *Corolla* very small. *Fr.*—pod, 1·3-5 × 1·3-2 cm., dehiscent, falcate, dark-brown, 2-4 seeded. *Fl. t.*—Jan.-Mar.

DISTR. :—Common in the dry plains and barren tracts of the Deccan (especially eastern part), Western Peninsula and S. India.

DESCR. OF WOOD :—*Colour*—sap-wood light brown ; heart-wood small, red. *Pores* moderate-sized, and often sub-divided, single or in groups, surrounded by pale loose tissue, coalescing into more or less continuous concentric bands. *Med. rays* moderately broad, showing a silver grain on a radial section. Very hard. *Wt.*—69 lbs. per c.ft.

USES :—Used as fuel.

ACACIA LEUCOPHLEA Willd.

FAM.—Mimosaceæ.

COM. NS. :—*E.* White-barked Acacia ; *G.* Haribaval ; *H.* Thind, Karir, Nimber, Safed-kika ; *K.* Bili-jali, Naibela, Topal ; *M.* Hivar.

CHAR. :—A moderate-sized or large deciduous tree, 7.5-15 m. high, girth 1.2-1.8 m. In dry places is reduced to a small bushy tree. *Bark* thick, pale yellowish-white and smooth when young ; dark-brown, almost black and rough when old ; exfoliating in patches and strips. Branchlets, leaves, petioles and branches of inflorescence grey-downy. *Spines* 6-2.5 cm., stipular, straight. Petiole with several cup-shaped glands. *L.*—pinnae 12-24, 2.5-4 cm. long ; leaflets 30-60, rigid, coriaceous, obliquely oblong obtuse. *Fl.*—small, pale-yellowish, nearly white, in globose heads, not more than .6 cm. diam., disposed in terminal leafless, about 30 cm. long, panicles ; peduncles short with 2 bracts. *Fr.*—pod, 10-20 × .6—·8 cm., sessile, slightly twisted, clothed with pale-brown or grey tomentum. Seeds 8-12. *Fl. t.*—Aug.-Nov. (sometimes as early as May). *Fr. t.*—Nov.-Apr.

DISTR. :—Throughout the dry Deccan districts ; common in the S. M. Country and Sholapur, in dry open forests, plains of the Punjab and U. Pradesh : Ceylon and Burma.

DESCR. OF WOOD :—*Colour*—sap-wood large ; heart-wood reddish brown or nearly brick-red, with lighter and darker streaks. *Pores* moderate-sized, uniformly distributed, in patches or short irregular concentric belts of pale soft tissue, alternating with dark-coloured firm tissue. *Med. rays* white, fine and moderate-sized, often slightly bent. Hard, strong and tough, seasons well, takes a fine polish but is somewhat brittle. *Wt.*—55 lbs. per c.ft.

USES :—Wood used for house-building, carts and their parts, and agricultural implements, is an excellent fuel. From the tough and strong fibre of the bark fishing-nets and cordage are made. The bark ground and mixed with bajri flour is eaten in times of scarcity. It is added to sugar and palm juice in the distillation of spirits on account of the tannin it contains, which serves to precipitate the albuminous substances of the juice. Tender pods are eaten as a vegetable, and the seeds boiled or ground and mixed with bajri flour.

See—Fibres, Famine Plants.

ACACIA SUMA Kurz.

FAM.—Mimosaceæ.

COM. NS. :—K. Banni-mara, Mugali ; M. Sone-khair (Kamtia).

CHAR. :—A small tree with downy branchlets, 4·5-9 m. high ; girth 9-1·2 m. Bark white or greenish-white, smooth, peeling off in small papery flakes and marked at intervals by horizontal patches of darker colour. Spines twin, short-hooked, infra-petiole. L.—rachis 7·5 cm. long, with a large cup-shaped, oval gland at the base and several smaller ones between several of the upper pinnæ ; pinnæ 20-40, 4-5 cm. long ; leaflets 60-100, approximate, rigid, pale-green, pubescent. Fl.—pale-yellow, almost white in axillary 1-4-nate, 7·5-10 cm. long, spikes. Fr.—legume, 7·5-10 × 1·3-2 cm., stipitate, and beaked, 6-8-seeded. Fl. t.—May-Aug. Fr. t.—Sept.-Oct.

DISTR. :—In N. Kanara near the Dharwar frontier and in the S. M. Country, usually in moist places, along *nalas*, not common. Bengal Bihar, W. Peninsula, Ceylon.

DESCR. OF WOOD :—Colour dark-brown. Close-grained. Pores small, enclosed in pale rings, single or occasionally joined in concentric lines. Med. rays fine, fairly numerous. Smooth, very hard, heavy, durable. Wt.—77 lbs. per c.ft.

USES :—Wood used for ploughs, cotton-rollers, and rice pestles. But the most valuable product of this and the allied species *A. chundra*, is *catechu*, *cutch* or *katha*. The bark is also used for tanning.

See—Dyes and Tans.

ACACIA TOMENTOSA Willd.

FAM.—Mimosaceæ.

COM. NS. :—M. Anjar.

CHAR. :—A small armed tree. Bark yellowish with large lenticels. Branchlets and petioles velvety with dense grey tomentum, the latter with several glands. Spines 2·5-5 cm. long, dark-coloured. L.—pinnæ 12-24, 2·5-5 cm. long ; leaflets 40-60, very small, linear, obtuse, grey, more or less pubescent, membranous. Fl.—white, purplish, 1·3 cm. diam. ; peduncles axillary, densely pubescent, with a bract about the middle. Fr.—pod, thin, flat, dry, dehiscent, falcately contorted, 10-15 × 1·3 cm., 6-10 seeded.

DISTR. :—Common in the Panch Mahals and Gujarat, rare in Khandesh, Dangs and Deccan Sholapur jungles. Western Peninsula : Ceylon. (Very doubtfully indigenous in the Bombay State, *Talbot*).

DESCR. OF WOOD :—No information available.

USES :—Wood used for fuel and fences.

ACHRAS SAPOTA (ZAPOTA) Linn.

FAM.—Sapotaceæ.

COM. NS. :—E. Sapodilla-plum ; H. Sapota ; K. Chukuhannu ; M. Chiku.

CHAR. :—A moderate-sized tree, 9-12 m. high ; (15-18 m. high in America) ; girth .9-1.2 m. Young shoots covered with tawny-tomentum. *L.*—5-7.5 cm., lanceolate-acuminate, obtuse or almost retuse, entire, glabrous, approximated near the ends of the branches ; petiole 1.3-2.5 cm. *Fl.*—6-merous, whitish, scentless, on solitary axillary pedicels, 1.3-2.5 cm. Calyx tawny-tomentose. Corolla slightly longer than the calyx. *Fr.*—berry, globose or oblong, when ripe covered with a brown, scabrous rind. Seeds 1-3 covered with yellowish tawny sweet pulp. *Fl. t.*—all the year round. *Fr. t.*—more profuse from Oct.-Apr.

DISTR. :—Cultivated for fruits ; grows well near the sea coast ; largely cultivated in districts of Kolaba, Thana, and South Gujarat and Saurashtra ; on small scale in the Deccan, Khandesh, and various parts of India. Native of Tropical America.

DESCR. OF WOOD :—*Colour* reddish-brown, with radial groups of pores in oblique patches. Fine *med. rays* and irregular narrow wavy transverse lines. Hard, heavy, durable.

USES :—Wood not used. Fruit is eaten and is excellent when slightly overripe.

See—Fruit Trees.

ACRONYCHIA LAURIFOLIA Blume.

FAM.—Rutaceæ.

COM. NS. :—K. Bhutali, Soneman.

CHAR. :—An evergreen tree, 3-6 m. high ; girth .6-.9 m. Young shoots and inflorescence puberulous. *Bark* grey, granular. *L.*—1-foliolate, opposite, 5.2-15.6 × 4.5-2 cm., elliptic, oblong-lanceolate, obtusely acuminate, entire, glabrous, with minute pellucid dots. *Fl.*—polygamous, yellowish-green, fragrant, on longish slender pedicels, on axillary oppositely branched corymbose cymes. Bracts and bracteoles small. Calyx 4-lobed, very small. Petals 4, ovate, linear-oblong, obtuse, revolute, valvate. Stamens 8 ; filaments alternately shorter, subulate, as long as the petals, villous below and inserted on a thick, 8-angled disc. Ovary tomentose, 4-celled. Style short ; stigma capitate, 4-grooved. *Fr.*—drupe, obsoletely 4-angled, 3-5-celled, apiculate, size of a large pea. Seeds black. *Fl. t.*—Aug. *Fr. t.*—Nov.-Jan.

DISTR. :—Moist forests of the N. Kanara ghats, common on the hills near Karwar. Widely spread throughout the tropics of the old world, Ceylon, Burma, Penang, Malacca, Java, Sumatra, Indo-China.

DESCR. OF WOOD :—*Colour* white or greyish-white. *Pores* moderate-sized, sometimes sub-divided, scanty, irregularly distributed in more or less concentrically arranged groups. *Med. rays* fine, irregularly spaced ; not numerous. Soft to moderately hard, smooth.

USES :—Wood is but little used. Leaves and bark said to be used in medicine.

ACTINODAPHNE HOOKERI Meissn.

FAM.—Lauraceæ.

COM. NS. :—K. Haggodimara, Tudgenasu ; M. Pichli, Pisa.

CHAR. :—A medium-sized evergreen tree. *Bark* light brown, smooth ; young shoots and petioles rusty-tomentose. *L.*—2.5-3 × 3.5 cm., in whorls of 5-8, more or less 3-nerved at the ends of branches, elliptic-lanceolate, or ovate-lanceolate, acute or acuminate, narrow, rounded at the base, glabrous in age, dark-green and shining above, glaucous beneath. *Fl.*—axillary, fascicled, few-flowered, covered with sub-orbicular golden scales. *Fr.*—somewhat like an acorn, oblong, resting on a concave cup. *Fl. t.*—Oct.-Nov. *Fr. t.*—Feb.-Mar. The verticels of white pubescent pendulous young leaves are very conspicuous in some of the evergreen forests of N. Kanara.

DISTR. :—Rain-forests along the ghats, Konkan, Matheran, Mahabaleshwar (very common), N. Kanara, Western Peninsula, Sikkim.

DESCR. OF WOOD :—*Colour* light-brown. Even-grained. *Pores* numerous moderate-sized, evenly distributed or roughly arranged in oblique lines, often sub-divided. *Med. rays* uniform, moderately broad. Moderately hard, strong and of excellent quality. *Wt.*—45 lbs. per c.ft.

USES :—Leaves and seeds used medicinally. Leaves are eaten by cattle.

See—Medicinal Plants, Fodder Plants.

ADANSONIA DIGITATA Linn.

FAM.—Bombacaceæ.

COM. NS. :—E. African Calabash, Baobab, Monkey-bread-tree of Africa ; G. Bukha, Gorakheer, Goruk Amla ; K. Brahmamlika ; M. Gorakh Chinch.

CHAR. :—A tree with a very thick trunk at the base but soon tapering like a cone, sometimes 18-21 m. high, 9 m. in diameter. *L.*—digitate, glabrous, pubescent beneath when young, deciduous ; leaflets generally 13-18.2 × 7.8-10.4 cm., long-obovate or oblong-lanceolate, acuminate, attenuated at the base, entire or sinuous at the margins. *Fl.*—white, solitary, axillary, pendulous, long-peduncled (often more than .3 m.). Calyx thick, coriaceous, fleshy, cup-shaped, 5-cleft, tomentose externally and clothed with silky hairs internally. Petals obovate, adnate below to the stamens. Staminal tube thick, dividing above into numerous filaments ; anthers long, linear, reniform or contorted, 1-celled. Ovary ovoid. Style long, filiform, divided at the summit into as many radiating stigmas as there are cells to the ovary. *Fr.*—pendulous, oblong, downy, woody, indehiscent, long. Seeds kidney-shaped, brown, immersed in a mealy, slightly acid substance. *Fl. t.*—May-June. Sheds leaves in dry season : new foliage in Apr.-June.

DISTR. :—Native of Africa ; cultivated in all parts of India, Dharwar, Gujarat, Hyderabad, Madhya Bharat, Bengal, Ceylon. Supposed to have been introduced by Arabs.

DESCR. OF WOOD :—*Colour* pale. Light, soft and porous.

USES :—Wood used as rafts to support fishermen in tanks ; and long fruits as float for fishing nets. Pulp surrounding seeds is used medicinally. Leaves dried and powdered are eaten mixed with food, Bark proposed as a substitute for quinine ; affords excellent fibre.

See—Medicinal Plants, Fibres.

ADENANTHERA PAVONINA Linn.

FAM.—Mimosaceæ.

COM. NS. :—*E.* Red Wood ; *G.* Bari-gumchi ; *K.* Manjadi, Manjuti ; *M.* Val, Mothi Gunja, Thorli Gunja.

CHAR. :—A deciduous unarmed tree, 15-18 m. high, girth 1·2-1·8 m. *Bark* grey. *L.*—abruptly bipinnate, 30-60 cm. long ; pinnæ 4-6 pair, opposite, short-peduncled, 10-20 cm. long ; leaflets 4-12 pairs, oblong, alternate, 1·5-3·75 cm. long on very short petiolules. *Fl.*—small, yellow, faintly fragrant, in short-peduncled racemes, 5-15 cm. long, simple from the axils of the leaves and paniced at the end of the branches. *Fr.*—pod, 15-23 × 1·3 cm., twisted, 10-12 seeded. Seeds scarlet red, shining, convex on both sides. *Fl. t.*—Mar.-May. *Fr. t.*—Aug.-Oct.

DISTR. :—Wild and planted. In the moist forests of Konkan and N. Kanara, nowhere abundant ; Gujarat, Khandesh, S. India, Bengal, Sikkim, Burma.

DESCR. OF WOOD :—*Colour*—sap-wood grey ; heart-wood red, close-grained. *Pores* small, scanty, in groups or short radial lines. *Med. rays* very fine, extremely numerous. Hard, heavy, durable. *Wt.*—56 lbs. per c.ft.

USES :—Wood used for house-building and cabinet work ; wood gives a red dye. Seeds are used as ornaments and as weights by goldsmiths and jewellers as they are said to be constant in weight, viz. 4 grains. Seeds are said to give an oil on extraction.

See—Dyes and Tans.

ADINA CORDIFOLIA Hook f.

FAM.—Rubiaceæ.

COM. NS. :—*G.* Haladwan ; *H.* Haldu Hardu, Karam ; *K.* Arsantega, Hedde, Yettaga ; *M.* Hedi, Hedu, Honangi ; *Tr.* Haldu.

CHAR. :—A large deciduous tree with erect trunk and horizontal branches ; 12-24 m. high ; girth 1·2-4·5 m. *Bark* brownish-grey, thick, furrowed, exfoliating in thick scales ; inner bark mottled, red. Young parts pubescent. *L.*—10-30 × 7·5-23 cm., coriaceous, pubescent beneath, cordate, abruptly acuminate, petiole thick. *Fl.* yellowish, in heads 2-2·5 cm. in diam. ; peduncles 2·5-5 cm. axillary, solitary, or 2-3, each bearing one head ; bracts small. Corolla

downy, style long-exserted; stigma clavate. *Fr.*—head consists of numerous capsules, dehiscing from the base. *Fl. t.*—June-Aug. *Fr. t.*—ripens Dec.-Mar. Sheds leaves in hot season; new foliage very soon.

DISTR. :—Common throughout India and the State in deciduous forests, Sub-Himalayan tract from the Jumna eastwards up to 900 m. altitude. Burma, Ceylon.

DESCR. OF WOOD :—*Colour* yellow; lustrous with smooth feel; no heart-wood. Even-grained. *An. rings* faint. *Pores* small, numerous, evenly distributed. *Med. rays* very fine, short, numerous. Moderately hard, durable, strong; seasons well but sometimes apt to warp and crack; decays soon when exposed to wet; easy to saw and machine; one of the nicest Indian woods to work by hand and turn; finishes very easily; takes stain and polish remarkably well. *Wt.*—45 lbs. per c.ft.

USES :—Wood used for buildings (chiefly planking), canoes, planking of river boats, packing cases, cigar-boxes, grain measures, sieve-frames, furniture, agricultural implements, yokes, gunstocks, brush-backs, combs, drums, cooper's work. Excellent, highly coloured wood for turning, carving, bobbins, and panelling, most suitable for bathroom, bakery and kitchen fittings; has given very satisfactory results as a decorative panel wood in Europe. Leaves are fed to cattle.

See—Fodder Plants.

ÆGLE MARMELOS Corr.

FAM.—Rutaceæ.

COM. NS. :—*E.* The Bæl tree, Bengal Quince; *H.* Bel. Bili; *K.* Bela, Bælpatri, Bilapatri; *M.* Bel.

CHAR. :—A small or moderate-sized tree, armed with axillary, straight, strong thorns 2·6 cm. long, 9-12 m. high and girth about 9-1·2 m. *Bark* 1·34 cm. thick, light cinerous grey, soft, corky, exfoliating in irregular flakes. *L.*—3-foliate, alternate. Leaflets 3 (very rarely 5), oblong or broadly ovate-lanceolate, acute or obtusely acuminate, crenulate, membranous, inconspicuously pellucid-punctate, the lateral ones smaller and almost sessile, the terminal one much larger, 5·2-5·9 × 3·6 cm., long-petioluled. *Fl.*—3·2 cm. diam., greenish-white, sweet-scented, on long slender, pubescent pedicels, forming axillary puberulous racemes. Calyx pubescent, deciduous. Petals oblong, coriaceous, thickly dotted, imbricate. Stamens numerous (30-40). Filaments distinct, subulate, inserted round a small disc. Anthers linear-oblong. Ovary ovoid, 8-20 celled; cells near the circumference. Style short; stigma capitate or oblong, deciduous. *Fr.*—woody, globose, oblong or sometimes pyriform, 5·2-13 cm. diam., smooth, grey or yellow. Seeds numerous, oblong, woolly, imbedded in a thick, sweet, aromatic, orange-coloured pulp. *Fl. t.*—about May. *Fr. t.*—rainy-season. Sheds leaves—Mar.-Apr.; new foliage at the end of hot season. A specimen with 7 and 9 leaflets has been observed in one of the houses in the City of Poona (Godbole).

DISTR. :—Wild in Gujarat and the Deccan, Konkan ; throughout India in dry places, wild or cultivated ; often cultivated near temples ; Sub-Himalayan tract from the Jhelum eastwards : Burma.

DESCR. OF WOOD :—*Colour* yellowish-white or greyish-white ; a strong aromatic scent when fresh cut. No heart-wood. *Pores* small, ringed, in small groups of 2 or 3 together, sometimes, but not always, more numerous in the autumn wood. *Med. rays* wavy, fine, short, white, numerous, uniform and equidistant. *An. rings* marked by distinct lines, and often by a continuous belt of pores. Hard, polishes well without absorbing much polish. *Wt.*—56 lbs per c.ft.

USES :—Wood used for buildings, agricultural implements, carts, naves of wheels, shafts, axles, pestles of oil and sugar mills, tool-handles, carving and combs. The chief value of the tree lies in its fruit, the pulp of which is used medicinally. It is said to be added to mortar to make it more tenacious. Snuff boxes are prepared from fruit rind. Twigs and leaves used as cattle fodder. This tree is held sacred and its leaves are offered to the god Shiva.

See—Medicinal Plants, Fodder Plants, Sacred Plants.

AGLAIA ODORATISSIMA Blume.

FAM.—Meliaceæ.

COM. NS. :—K. Tottla.

CHAR. :—A large evergreen tree, all young parts covered with ferruginous tomentum. *Bark* light brown, smooth, peeling off in flat rectangular shreds. *L.*—pinnate, 8-21 cm. long or more ; petiole 8 cm. long. Leaflets 5, rarely 7 or 3, 5-13 × 2-6-4 cm., opposite or alternate, obovate-lanceolate or elliptic oblong, acute, obtuse at the tip, acuminate or slightly cuneate at the base, entire, glabrescent, pale beneath on small petiolules. *Fl.*—yellow, shortly pedicellate, in rather supra-axillary panicles longer than the leaves. Calyx 5-cleft. Petals 5, imbricate, elliptic-oblong. *Fr.*—globose or pyriform, 2 cm. diam., buff-coloured, 1-seeded. *Fl. t.*—Nov.-Dec. *Fr. t.*—May-July.

DISTR. :—In the evergreen forests of N. Kanara ghats usually in ravines near water. Western Peninsula from Konkan southwards, northern limit Mount Abu on the west, Midnapur on the east side, Ceylon, Singapore, Burma, Malay Peninsula.

DESCR. OF WOOD :—*Colour* bright red, handsomely marked. Close-grained. *An. rings* distinguished by darker belts. *Pores* small, scanty, in narrow rings of whitish tissue, which run concentrically and appear on a cross-section as narrow wavy lines. *Med. rays* fine, numerous, evenly distributed ; the distance between them equal to or less than the diameter of pores. Strong, hard. *Wt.*—30 lbs. per c.ft.

USES :—Wood used for naves and wheel spokes.

AGROSTISTACHYS LONGIFOLIA Benth.

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A large shrub or a small tree; branches stout, marked with the scars of petioles and stipules, younger parts glabrous, very resinous. *L.*—numerous, crowded at the ends of the branches $15.50 \times 4.7.5$ cm., oblanceolate, nearly sessile, quite entire, glabrous, stiff and leathery. *Fl.*—in spiciform racemes, much shorter than the leaves. Males in clusters in the axils of each bract; sepals 2-3, entire; petals 5: disk-glands large; stamens 8-13. Females fewer, solitary, distant along the rachis, with longer, jointed pedicels; sepals 5; disk large, lobed. *Fr.*—capsule, nearly 1 cm. in diameter, 3-lobed; cocci globose, smooth, crustaceous. Seeds globose, smooth, brown. *Fl. t.*—July-Oct. *Fr. t.*—ripe Feb.-Apr.

DISTR. :—Evergreen forests of N. Kanara, on the Supa ghat, along the streams; Western Peninsula on the ghats from Kanara to the Nilgiris and Travancore, Ceylon, Andamans.

DESCR. OF WOOD :—*Colour* light-brown. *Pores* small in radial strings between the fine and very numerous indistinct *med. rays*. Moderately hard. *Wt.*—38 lbs. per c.ft.

USES :—The stiff large hard leaves are used in Ceylon for roofing huts, like shingles, and are durable.

AILANTHUS EXCELSA Roxb.

FAM.—Simarubaceæ.

COM. NS. :—G. Moto-aduso; H. & M. Maha-ruk, Varul; K. Doddamara, Bend-hebberu, Helbevu.

CHAR. :—A handsome large tree, 18-24 m. high. *Bark* light greyish-brown, fibrous or granular, rough. *L.*—abruptly pinnate, 3-5 m. long; young ones more or less villous, old glabrous. Leaflets nearly opposite, 8-12 pair, $5.2.10.4 \times 4.5.2$ cm., ovate, often broad falcate-lanceolate, acuminate at the apex, very unequal at the base, long-petioled, coarsely and deeply toothed, often lobed. *Fl.*—yellowish, polygamous, small, about 3 lin. diam., on slender longish pedicels, arranged in axillary, large, often very much-branched panicles. Petals glabrous within, ovate-lanceolate, usually reflexed. Stamens in male flowers 10 (in the hermaphrodite 2-3). Ovary rudimentary or none. Stamens in *female flowers* abortive. Ovary 2-5-partite. *Fr.*—of 1-5, 1-seeded samaras, wing large membranous. Seed pendulous. *Fl. t.*—Feb.-Apr. *Fr. t.*—end of hot season. Sheds leaves during cold season; new foliage Mar.-Apr.

DISTR. :—Common in Gujarat (Broach, Baroda), Khandesh, the Deccan (Bijapur district). From the Ganges downwards to Madhya Bharat, S. India, W. Peninsula; occasionally in Rajasthan, Ceylon; often cultivated.

DESCR. OF WOOD :—*Colour* white. *Pores* large, scanty, subdivided, ringed. *Med. rays* broad, numerous, close, the distance between them less than the transverse diameter of the pores. Soft, spongy, not durable. *Wt.*—about 28 lbs. per c.ft.

USES :—Wood used for packing-cases, matches, sword-handles, spear-shafts, catamarans, fishing floats. Bitter bark used medicinally.

See—Medicinal Plants.

AILANTHUS MALABARICA DC.

FAM.—Simarubaceæ.

COM. NS. :—K. Bagadhup, Gugguldhup, Muddhedhup.

CHAR. :—A large deciduous tree, 18-24 m. high, sometimes 30 m., 1-2 m. diameter. *Bark* grey, thick, rough, often studded with bright, reddish grains of resin. *L.*—40-44 cm. long, unequally pinnate, quite glabrous. Leaflets 6-10, 7·8-18·2 × 4 cm., sub-opposite or opposite, distant, long, acuminate, the base and two sides very unequal; margin often thickened and undulated, almost entire, coriaceous, shining above, pale beneath. Petioles long; petiolules 3-4 lin. *Fl.*—small, white, on small, pubescent pedicels, forming large terminal panicles, nearly as long as the leaves. Calyx slightly pubescent and ciliate. Petals nearly 3 lin. long, slightly imbricate at the edges. Disc 10-lobed with a minute rudimentary 3-lobed ovary in the male flower. Stamens much longer than corolla. *Female fl.* with 10 sterile stamens, alternately shorter. *Fr.*—samara, oblong, reddish, obtuse at both ends, veined, not twisted. *Fl. t.*—Feb.-Mar. *Fr. t.*—end of hot season. Sheds leaves in hot season.

DISTR. :—Throughout the Konkan and N. Kanara in evergreen forests, from the sea-level upwards. Common in forests of W. Ghats down to Cape-Comorin. Often planted in S. India, Ceylon, Burma, Indo-China.

DESCR. OF WOOD :—*Colour* white. *Pores* large, scanty, subdivided. *Med. rays* short, moderately broad, the distance between the rays being greater than the transverse diameter of pores. Very soft, spongy, light. *Wt.*—23 lbs. per c.ft.

USES :—Wood is useless. Yields a soft, darkbrown fragrant resin—called Mattippal—used in Indian medicine as a remedy for dysentery and as a stimulant in chronic bronchial affections; also burnt as incense in Indian temples. Bitter bark is also said to be used as a medicine in fevers.

See—Gums and Resins.

ALANGIUM SALVIFOLIUM Wang.

FAM.—Alangiaceæ.

COM. NS. :—E. Sage-leaved Alangium; G. Ankola, Ankoli, Onkla; H. Akoly, Ankora, Anedhera; K. Ankul, Asroli, Lucki; M. Ankol.

CHAR. :—A small, almost evergreen tree, 6-12 m. high; girth 6-9 m.; branches more or less spinescent. *Bark* thin, grey, orange-yellow when young, smooth. *L.*—7·5-15 × 2·5-5 cm., membranous, oblong or elliptic, obtuse, acute, or acuminate, somewhat rounded and unequal at the base, pubescent or tomentose when young, glabrous when old, more or less pubescent below, often with scattered hairs, hollow glands in the axils of the veins; petiole hairy or villous. *Fl.*—white, hermaphrodite on short bracteate

pedicels, solitary or fasciculate in the axils or above the scars of the fallen leaves. Calyx 5-10-toothed. Petals 5-10. Pedicels, calyx and petals woolly. Stamens about 20-30. Ovary inferior, 1-celled, surmounted by a disc. Style long. Stigma large. *Fr.*—oblong, 1.3-2 cm., purplish red when ripe, small, crowned by the calyx limb. *Fl. t.*—Jan.-Apr. *Fr. t.*—May-Aug. New leaves in Apr.-May, sometimes at other seasons.

DISTR. :—Throughout the State in dry places; often along the banks of *nalas* in N. Kanara, Konkan, Deccan, S. M. Country. Throughout India, Ceylon, S. China, Malaya, Philippines.

DESCR. OF WOOD :—*Colour*—sap-wood light-yellow; heart-wood olive-brown with a pleasant scent. Close and even-grained. *Pores* small, scanty, in short radial lines of 2 to 5. *Med. rays* fine, closely packed, wavy, bent round the pores, the diameter of which is slightly larger than the distance between the rays. Hard, seasons and works well, tough, strong with glossy surface, takes a good polish without absorbing much polish. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for ploughs, cattle bells and other agricultural purposes, cart-wheels, pestles and oil-mills; suitable for carving, inlaying and small fancy work. Yields excellent fuel. Root-bark, stem, leaves and fruit used medicinally. Acidic astringent fruit is eaten.

See—Medicinal Plants, Fruit Trees.

ALBIZZIA AMARA Boiv.

FAM.—Mimosaceæ.

COM. NS. :—K. Bel-Khambi, Tugli; M. Lullei.

CHAR. :—A middle-sized, much-branched, unarmed deciduous tree. *Bark* dark coloured, smooth, thin, scaly. Branchlets, petioles and inflorescence densely pubescent. *L.*—common rachis 5-10 cm., with one small circular gland below the pinnæ, and one above, at the insertion of one pair of the pinnæ. Pinnæ 8-20, 2.5-7.5 cm., leaflets 30-60, membranous, sessile, caducous, glaucous beneath, the midrib nearly in the middle. *Fl.*—yellow, fragrant in heads, on numerous peduncles, crowded in the axils of the uppermost much reduced leaves. Calyx minute. Corolla three times the length of the calyx. *Fr.*—legume, 10-15 × 2.5 cm., pale-brown, 6-10 seeded. *Fl. t.*—Apr.-June. *Fr. t.*—Sept.-Oct.

DISTR. :—Throughout the State in dry forests; common at Mahabaleshwar in ravines on the banks of the Krishna, Matheran, S. M. Country (hills near Belgaum), Western Peninsula, Ceylon, E. Tropical Africa.

DESCR. OF WOOD :—*Colour*—sap-wood large white; heart-wood purplish-brown, beautifully mottled, with alternate, concentric light and dark bands. *Pores* moderate-sized, scanty, in patches of soft tissue, which are frequently joined, forming short, concentric bands. *Med. rays* very fine, numerous. Very hard, strong, tough, durable; polishes well but absorbs a fair amount of polish. *Wt.*—60 lbs. per c.ft.

USES :—The same as other Albizzias.

ALBIZZIA CHINENSIS Merr.

(ALBIZZIA STIPULATA Boiv.)

FAM.—Mimosaceæ.

COM. NS.:—G. Shambar; H. Kanujerla, Pathia, Samsundra, Siran; K. Bangana, Hote or Kal bege; M. Kasir, Lacli Udul.

CHAR.:—A large unarmed evergreen tree, 18-24 m. high, girth 2.4-3.6 m. *Bark* grey with numerous short vertical wrinkles and a few horizontal furrows, with prominent edges, darker when old. Branchlets, petioles and inflorescence tomentose or downy. *L.*—common petiole 15-30 cm., with a large gland near the base, and several smaller ones between the pinnæ. Pinnæ 12-40, 10-12.5 cm.; leaflets 40-80, membranous, sensitive, sessile, glaucous beneath, broader at the base, acute at the apex. Stipules large, cordate, acute, membranous, velvety, pubescent. *Fl.*—yellowish, inodorous, almost sessile; stamens pink. Heads on 1.3-2.5 cm. downy peduncles, clustered or racemose disposed in terminal panicles. Calyx very small, funnel-shaped. Corolla three times longer. *Fr.*—legume, 12.5-15 × 2.2-5 cm., flat, indehiscent, pale-brown, 8-10 seeded. *Fl. t.*—Apr.-June. *Fr. t.*—Sept.-Oct.

DISTR.:—Common in the evergreen forests of the Konkan and N. Kanara ghats. (Matheran, Khandala, Mahableshwar). S. M. Country; tropical Himalaya; Ceylon, Burma.

DESCR. OF WOOD:—*Colour*—sap-wood large white; heart-wood brown, generally not durable, shining, close-grained. *An. rings* distinctly marked. *Pores* large, often oval and sub-divided, very prominent on a longitudinal section. *Med. rays* fine, short, reddish, not very distinct. Wood soft, not very durable; takes fine polish but absorbs a fair amount of polish. *Wt.*—23 lbs. per c.ft.

USES:—Wood used for buildings (chiefly planking, sometimes house posts), furniture, dug-out canoes, tea-boxes, utensils (bowls, spoons, etc.), well-construction, cooper's work, combs and turning. It gives a copious gum from the stem which is used in Nepal for sizing their "Daphne" paper. Branches are lopped off for cattle fodder. The chief use of the tree has been as a shade plant for tea in Assam and for coffee in S. India. It is strongly believed that the amount of nitrogen in the soil is largely increased by the presence of these trees.

See—Gums and Resins, Fodder Plants.

ALBIZZIA LEBBEK Benth.

FAM.—Mimosaceæ.

COM. NS.:—E. Parrot or Siris or Sizzling tree; G. Kalsadasado, Kalo or Piloshirish; H. Gars, Kalshish, Sirai, Tantia; K. Dodde or Hombage, Sirisa; M. Chinchola, Kalashirish, Shirish; Tr. Kokko.

CHAR.:—A tall unarmed deciduous tree, 9-12 m. high; girth 1.8-3 m. *Bark* brownish-grey, rough with numerous short irregular cracks. *L.*—common petiole 7.5-30 cm., glabrous or downy, with

a large gland near the base. Pinnæ 4-8 with or without one or more glands between the lowest; leaflets 8-18, unequal-sided, rigid, glabrous or pubescent, obtuse, 2.5-4 cm. *Fl.*—white, fragrant, glabrous or downy, larger than in the last species. Heads many-flowered, on peduncles 3-4 together, arising from the uppermost axils. *Fr.*—legume, 20-30 × 2.4 cm., firm, yellow-brown, thin, 6-12-seeded. *Fl. t.*—Apr.-June. *Fr. t.*—Aug.-Sept. New leaves Mar.-Apr.

DISTR. :—Dry and moist monsoon forests; throughout the State; commonly planted along roadside. Throughout India, usually planted; sub-Himalayan region from the Indus eastwards, Bengal; Burma, Ceylon, Tropical Asia and Africa.

DESCR. OF WOOD :—*Colour*—sap-wood large, white or yellowish; heart-wood dark-brown, streaked with lighter or darker streaks. *An. rings* sometimes marked by a line. *Pores* scanty, large, in rings of soft tissue, in oblique somewhat radial strings, very prominent as dark streaks on a radial section. *Med. rays* fine, distant, not conspicuous in silver-grain. Hard, strong, moderately durable; seasons well; rather difficult to saw and work; can be finished to a good surface by hand; polishes well absorbing little polish. A handsome wood; the 'burrs' are particularly valuable. *Wt.*—41 lbs. per c.ft.

USES :—Wood used for buildings (posts and beams), furniture, ploughs, rollers, oil-mills, sugar-cane crushers, well-curbs, boats, carts and their parts, combs, walking sticks, toys, cooper's work, turnery; excellent for carving. Leaves and twigs are lopped for fodder. Tree is often grown as an avenue tree.

See—Fodder Plants.

ALBIZZIA ODORATISSIMA Benth.

FAM.—Mimosaceæ.

COM. NS. :—*G.* Kalo-serasio; *H.* Bersa, Bhandir, Kalia-siris, Siran; *K.* Billawar, Bilkumbhi, Godhunchi, Pullibaghi; *M.* Borhi-Chichanda, Kala Siris; *Tr.* Black Siris.

CHAR. :—A tall unarmed, almost evergreen tree, 9-12 m. high (in favourable conditions higher); girth 1.5-1.8 m. *Bark* grey with irregular cracks and darker patches, granular, 1.3 cm. thick, inner bark purple, fibrous. Branchlets, petioles, inflorescence and under side of the leaves finely downy. *L.*—common petiole 15-30 cm. long, with a gland at the base, and of the 1-2 upper pinnæ. Pinnæ 6-16, 10-15 cm., leaflets 16-50, oblong, unequal-sided, rigid, glaucous beneath, with the midrib parallel with the upper edge at a short distance from it. *Fl.*—pale-yellow, fragrant. Heads few-flowered, very numerous; peduncles disposed in corymbose panicles, terminal or from the upper leaf-axils. Calyx very small, about five times shorter than grey-silky corolla. *Fr.*—legume, 15-20 × 2.5-4 cm., firm opaque or glossy, 8-12 seeded. *Fl. t.*—Apr.-June. *Fr. t.*—rainy season.

DISTR. :—Common in the moist forests of N. Kanara and the Konkan; also in the dry Deccan. Sub-Himalayan regions from the Indus eastwards ascending to 900 m.; Assam, Southern India, Madhya Bharat : Burma.

DESCR. OF WOOD :—*Colour*—sap-wood large, white; heart-wood dark-brown, with darker streaks. *An. rings* sometimes marked by a belt with few or no pores. *Pores* moderate-sized to large, often sub-divided in rings of soft tissue, oblique strings less prominent than in *A. lebbek*, prominent on a vertical section as dark streaks. *Med. rays* fine, rather distant, short silver-grain of long shallow plates. Hard, moderately durable; seasons well, rather difficult to work and saw; takes an excellent polish. *Wt.*—54 lbs. per c.ft.

USES :—Wood used for house-building, carts and their parts, agricultural implements, cooper's work. Excellent for high class furniture, interior decorations and panelling. Tree gives a dark brown gum. Leaves and twigs are lopped for cattle fodder.

See—Gums and Resins, Fodder Plants.

ALBIZZIA PROCERA Benth.

FAM.—Mimosaceæ.

COM. NS. :—*E.* White-Siris; *H.* Garso, Gurbari, Karanji, Karo Safed-Siris; *K.* Bellati, Chikul, Salajindi; *M.* Gurar, Kinhal; *Tr.* White-Siris.

CHAR. :—A large deciduous unarmed tree, 18-24 m. high (in favourable places 30 m.); girth 1·8-2·7 m. or more. *Bark* 1·3 cm. thick, yellowish or greenish-white or grey, smooth, with horizontal lines. Tender leaves downy. *L.*—common petiole 15-30 cm. with a large, brown, oblong gland near the base. *Pinnæ* 4-12; leaflets 12-24, short-petioled, sub-coriaceous, rigid, obtuse, 2·5-4 cm., obliquely truncate at the base. *Fl.*—yellowish-white, borne on peduncles 2·5 cm. long in fascicles of 2-5, arranged into more or less ample terminal panicles. *Fr.*—Legume, 15-23×2·2-5 cm., thin, reddish-brown, dehiscent, 8-12-seeded. *Fl. t.*—May-June. *Fr. t.*—Jan.-Feb.

DISTR. :—Throughout the State; common in the N. Kanara and the Konkan moist forests, in the dry districts along ravines and *nalas*, central and eastern Himalayas, Western Peninsula. Burma, Malay Archipelago.

DESCR. OF WOOD :—*Colour*—sap-wood large, yellowish-white not durable; heart-wood brown, shining, with alternate belts of darker and lighter colour. *An. rings* not usually visible. *Pores* moderate-sized and large, in narrow rings of soft tissue, uniformly distributed in small groups of a few, very prominent on a longitudinal section. *Med. rays* fine, short, distant. Hard, moderately durable, seasons well; takes good polish without absorbing much polish; rather difficult to saw and machine. *Wt.*—46 lbs. per c.ft.

USES :—Same as *A. lebbek*. It is an excellent fuel and makes good charcoal. It gives copious gum,

See—Gums and Resins.

ALEURITES MOLUCCANA Willd.

FAM.—Euphorbiaceæ.

COM. NS. :—*E. Belgaum Walnut, Candle Nut tree.*

CHAR. :—A handsome ornamental evergreen tree, 12-18 m. high, girth 1.5-1.8 m. Young shoots covered with a brownish stellate tomentum. *L.*—10-20 × 7.5-15 cm., collected at the ends of branches, ovate-lanceolate, acute or acuminate, often 3-5-lobed and covered with a brownish or whitish tomentum when young and glabrous when old, cordate or obtuse at the base with 2 glands at the insertion of the petiole. *Fl.*—numerous, rather small, white, on large terminal panicles; male flowers usually at the ends of the branches of the panicles; female flowers sessile in the divisions of the panicles. Calyx both of male and female flowers pubescent or tomentose. Styles 2, 2-cleft. *Fr.*—drupe, 2.5-5 cm. diam., fleshy, a little compressed, olive-coloured, containing 2-or by abortion a single hard 1-seeded nut. *Fl. t.*—Apr.-May. *Fr. t.*—rainy season; fruits ripen next cold season.

DISTR. :—Planted in gardens throughout the State: indigenous in the Malay Archipelago.

DESCR. OF WOOD :—*Colour* white. Soft, light. It is of no use. *Wt.*—38 lbs. per c.ft.

USES :—The kernel is eaten but is inferior in taste to that of the walnut. They yield about 50 per cent. a fine, clear oil called *Kecuna*.

See—Fruit Trees, Oils.

ALSEODAPHNE SEMECARPIFOLIA Nees.

FAM.—Lauraceæ.

COM. NS. :—*K. Mashe, Nettare; M. Miri, Phudgus.*

CHAR. :—A moderate-sized (sometimes large), evergreen tree; 7.5-9 m. high. *Bark*, yellowish brown, thick, vertically furrowed (Gamble), dark-coloured, smooth (Talbot). Glabrous, except the young shoots which are tawny-pubescent. *L.*—7.5-25 × 5-10 cm., ovate or obovate-oblong, obtuse at the apex, narrowed at the base, rigidly coriaceous, green, shining above, glaucous beneath; veins reticulate. *Fl.*—yellowish green in panicles, axillary or from the scars of the fallen leaves. *Fr.*—berry, 1.3 cm. long, oblong. *Fl. t.*—July-Dec. *Fr. t.*—hot season (Apr.-May).

Var. *angustifolia* Meissn. :—Leaves 7.5-12.5 × 2.5-4 cm., oblong-lanceolate, obtuse, glaucous beneath.

DISTR. :—Western Peninsula from the Konkan southwards. On the Konkan and N. Kanara ghats usually in evergreen forests from the coast inland.

Var. *angustifolia* Meissn. :—Common near Yellapur, N. Kanara.

DESCR. OF WOOD :—*Colour* dark-brown. *Pores* moderate-sized, scanty, enclosed in loose tissue. *Med. rays* fine, wavy, not numerous. Moderately hard, strong. *Wt.*—48 lbs. per c.ft. An excellent timber.

USES :—Wood used for buildings : also for building boats, as it is not attacked by Teredo.

ALSTONIA SCHOLARIS R. Br.

FAM.—Apocynaceæ.

COM. NS. :—*E.* Dita-bark tree ; *H.* Chatian, Satian, Satwin ; *K.* Male Janthella, Kaduhale, Kodale, Modale, Mudhole ; *M.* Satwin.

CHAR. :—A tall evergreen tree, 12-18 m. high (under favourable conditions even 27 m.) ; girth 1.2-1.5 m. ; with bitter milky juice ; glabrous except the inflorescence ; branches whorled ; young branches copiously lenticellate. *Bark* grey, rough, lenticellate. *L.*—10-20 × 4-6 cm., in whorls of 5-7, oblong or ovate-oblong, obtuse or acute, narrowed into a short petiole, coriaceous, shining above and pale underneath, entire. *Fl.*—greenish-white, sessile or sub-sessile in pedunculate cymes. Peduncles 2.5-5 cm. long ; cymes 8-12, arranged in an umbel. Calyx-segments ovate. Corolla-lobes pubescent outside ; the throat closed by a ring of hairs. *Fr.*—2-follicles, slender, 3.45 m. long. Seeds about .6 cm. long, covered with hairs all round. *Fl. t.*—Dec.-Mar. *Fr. t.*—June.

DISTR. :—Throughout the State usually in monsoon forests from Bombay southwards. Common in the rain forests of N. Kanara. Drier forests of India, Ceylon, Java, tropical Africa, E. Australia.

DESCR. OF WOOD :—*Colour* white. Even-grained. *Pores* moderate-sized, oval, sub-divided, ringed, scanty. *Med. rays* fine, white, distinct, crossed by wavy lines of white tissue. Soft, not durable ; seasons badly and soon gets mouldy and discoloured if allowed to season in log ; works easily. *Wt.*—30 lbs. per c.ft.

USES :—Wood used for boxes, cheap furniture, tea-boxes, scabbards. Used in Burma for coffins, blackboards, and carved images. Root, bark, leaves are used medicinally.

See—Medicinal Plants.

AMOORA CANARANA Hiern.

FAM.—Meliaceæ.

COM. NS. :—No common names.

CHAR. :—A medium-sized tree, young parts lepidote. *Bark* smooth. *L.*—abruptly pinnate, 16-39 cm. ; leaflets 4-6 pairs, sub-alternate, 8-12 × 4-7 cm., oblong, acute or acuminate, glabrous above, lepidote beneath, narrowed at the base. *Fl.*—small, in dense divaricately-branched panicles, much shorter than the leaves ; buds globose ; pedicels short. Calyx obtusely 3-5 toothed, lepidote outside, Petals 3-4, orbicular, glabrous. Staminal tube obovoid, glabrous, truncate at the apex, the mouth open. Anthers 6, sessile, attached near the mouth of the tube, tips just exerted. Ovary lepidote, style 0, stigma lepidote. Fruit obovoid. *Fl. t.*—Mar.-Apr. (Cooke). *Fl. t.*—May-July (Talbot). *Fr. t.*—Jan.-May.

DISTR. :—Throughout the evergreen forests of N. Kanara ghats, Assam, E. Bengal, Silhet, Southern and Western India, Ceylon.

DESCR. OF WOOD :—*Colour* reddish. Close-grained. *Pores* small, joined by short lines in the autumn wood and by more continuous fine white lines in the spring wood. *Med. rays* very fine and close. *An. rings* visible. Strong, smooth, very hard. *Wt.*—about 61 lbs. per c.ft.

USES :—Wood apparently not much used.

AMOORA LAWII Benth. and Hook. f.

FAM.—Meliaceæ.

COM. NS. :—K. Mudrasada ; M. Burumb.

CHAR. :—A middle-sized tree. *Bark* smooth and grey ; all the young parts and inflorescence covered with yellowish-brown scales. *L.*—unequally pinnate, 15·6-23·4 cm. Leaflets 3-5 by 4·5-2 cm., alternate or opposite, lanceolate or elliptic-lanceolate, acuminate, narrow at the base, glabrous. *Fl.*—very small, white, forming much-branched axillary panicles. Calyx 4-toothed, scaly. Petals 4. Anthers 8, rarely 7 ; staminal tube orbicular, sub-entire or crenated. Ovary lepidote, 3-celled, with 1 ovule in each cell. *Fr.*—capsule, 2·6 cm. long, pyriform, 3-valved, abounding in white resinous juice. *Fl. t.*—Dec.-Jan. *Fr. t.*—ripe in rainy season.

DISTR. :—Western Peninsula from the Konkan (Nagothna, Roha) southwards. Khandala. Common in the evergreen forests of N. Kanara. Madras State.

DESCR. OF WOOD :—*Colour* brick-red. Even-grained, lustrous. *Pores* small, unequal-sized in the heart-wood, mostly closed and joined by irregular, concentric, close, short lines of red tissue. *Med. rays* fine, numerous, white. *Wt.*—64 lbs. per c.ft.

USES :—Not much used. It is worthy of attention as the timber is available in quantity in parts of Belgaum and Kanara.

AMOORA ROHITUKA W. & A.

FAM.—Meliaceæ.

COM. NS. :—H. Harin harra or khana ; K. Mulla-muttala ; M. Rohitak.

CHAR. :—A large evergreen tree, trunk straight, 15-18 m. high ; girth 1·2 m. *Bark* thin, grey, rough. Young parts tawny, closely tomentose. *L.*—3·9 m., coriaceous, glabrous. Leaflets 9-15, 7·8-23·4 × 3·5-10·4 cm., opposite, oblong or ovate-lanceolate, acuminate at the apex, somewhat unequal at the base, entire, shortly-petioluled. *Fl.*—white or greenish-white, bracteate, sub-sessile, about 4 lin. diam. ; male spikes panicked ; female simple. Calyx 5-partite. Petals 3, oval. Staminal tube entire, globular. Ovary 3-celled. *Fr.*—capsule, smooth, globose, pale-yellow or reddish,

2.6-4 cm. diam. Seeds oblong, enclosed in a fleshy arillus. *Fl. t.*—rainy season. *Fr. t.*—cold season up to Mar. *Fl.* and ripe fruit hot season. May (Talbot).

DISTR. :—Fairly common in the evergreen forests of N. Kanara ; W. Peninsula from N. Kanara southwards to Anamalais. Sub-Himalayan tract from the Tapi river eastwards, Sikkim, Assam, Chota-Nagpur ; Burma, Andamans and Cocos Islands. This handsome tree is sometimes planted for ornament.

DESCR. OF WOOD :—*Colour* reddish. Close and even-grained. *Pores* small and moderate-sized. *Med. rays* moderately broad, uniform and equidistant, distinctly visible on a radial section. Pores joined by reddish, soft, wavy, concentric lines. Concentric lines and concentric bands in this species are remarkable, as they are absent from the two other species here described. Hard, rather heavy, takes a fine polish. *Wt.*—40 lbs. per c.ft.

USES :—House-building, tea-boxes, dug-out canoes and knees of boats. In Bengal oil is extracted from the seed.

See—Oils.

ANACARDIUM OCCIDENTALE Linn.

FAM.—Anacardiaceæ.

COM. NS. :—*E.* Cashew Apple or Nut ; *G.* Kaju ; *H.* Kaju ; *K.* Gerubi, Godambe, Kampu ; *M.* Kaju.

CHAR. :—A small evergreen tree with a short thick trunk, 7.5-9 m. high, girth 6-9 m. *Bark* thick, rough, grey-coloured. *L.*—coriaceous, 10-15 × 3.8-7.5 cm., obovate or elliptic, rounded at the apex, shining above. *Fl.*—in terminal panicles with cymose branching, yellow with pink stripes. *Corolla* petals linear lanceolate, deflexed. *Fr.*—nut, reniform, 2.5 cm. long, dark-coloured on a pyriform yellow, orange or red-coloured fleshy peduncle. *Fl. t.*—Jan.-Mar. *Fr. t.*—Mar.-Apr.

DISTR. :—Introduced from S. America. Naturalised throughout the State ; very common near the seashore in open situations in Konkan and N. Kanara, especially in sandy places and often gregarious ; along the coast forests of India and Ceylon ; also cultivated.

DESCR. OF WOOD :—*Colour* reddish-brown. Close-grained. *Pores* large, filled with pithy substance, prominent on a vertical section. *Med. rays* fine, dark, interrupted, indistinct. Moderately hard, shining. *Wt.*—38 lbs. per c.ft.

USES :—Wood used for packing cases in Ceylon and in Burma for boat-building and charcoal. Seed kernels yield a light yellow bland oil similar to almond oil. From fruit-shell is prepared a black acrid oil. Seeds are eaten. Fleshy stalk is also eaten as fruit. Bark is astringent. Bark, leaves (rarely), flowers, fruits and oils are used medicinally. A wine is prepared from the juice of the fleshy peduncle in Goa.

See—Medicinal Plants, Oils, Fruit Trees.

ANOGEISSUS LATIFOLIA Wall.

FAM.—Combretaceæ.

COM. NS. :—*E.* Button tree ; *G.* Dabria, Damora, Dhavda ; *H.* Bakla, Dhava, Dohu ; *K.* Bejjalu, Dindala, Dindiga ; *M.* Dhavda ; *Tr.* Axle-wood.

CHAR. :—A large erect deciduous tree, 9-15 m. (sometimes 24 m.) high ; girth 1·8-2·7 m. Bark smooth, light coloured, with shallow irregular depressions caused by exfoliations. Branchlets and young leaves with soft, silky or rusty pubescence. *L.*—5-13 cm. on petiole, coriaceous, ovate, or broad-elliptic, obtuse, retuse or emarginate. *Fl.*—heads in axillary racemes ; peduncles one or more from the same axil, often branched. *Fr.*—very small, 2-winged, prickly, glabrous. Seed solitary. *Fl. t.*—May-July. *Fr. t.*—Nov.-Feb. Leafless during the whole of the cold season ; new leaves in Apr.-May.

DISTR. :—Very common throughout the State usually in dry deciduous forests. Throughout the greater part of India : Ceylon.

DESCR. OF WOOD :—*Colour* grey, shining, with a small purplish-brown, irregularly shaped, very hard heart-wood ; sap-wood in young trees and branches yellow. *An. rings* marked by lines without pores. *Pores* small, very numerous, often sub-divided, surrounded either singly or in patches by loose tissue, the patches arranged obliquely or transversely in a roughly concentric fashion. *Med. rays* very fine, extremely numerous, uniform, equidistant. The transverse diameter of the pores is about equal to the distance between the *med. rays*. Fairly fine texture ; straight or interlocked grains. Hard, smooth, strong, tough ; not much durable ; apt to split in seasoning ; polishes well without absorbing much polish. *Wt.*—62 lbs. per c.ft.

USES :—Wood used for building carts and their parts, furniture, agricultural implements, rice-pounders, tool-handles, spinning wheels, boat-building, mining timber (Kolar Gold Fields). It gives a good fuel and excellent charcoal. It gives a gum which is extensively used in cloth-printing. Leaves are used for tanning.

See—Dyes and Tans, Gums and Resins.

ANOGEISSUS PENDULA Edgw.

FAM.—Combretaceæ.

COM. NS. :—*G.* Dhao, Kala-dhankra.

CHAR. :—A small tree, branches pendulous ; young parts pubescent. *L.*—small, alternate and sub-opposite, elliptic or obovate, obtuse or acute, mucronate, pubescent on both sides, attenuated at the base. *Fl.*—in small globose heads ; peduncles solitary. *Fr.*—subquadrate, ultimately glabrous. *Fl. t.*—May-June.

DISTR. :—Rare in Bombay State, Gujarat, Panch Mahals ; Rajasthan, Bundelkhand, Nimar.

DESCR. OF WOOD :—*Colour* yellowish-white, with a small irregular blackish-purple heart-wood. *An. rings* indistinct. *Pores* very small and extremely small, in somewhat radial groups between

the very fine, very numerous, uniform and equidistant *med rays*. Hard, strong. *Wt.*—59 lbs. per c.ft.

USES :—Wood used for posts, rafters, carts, waggons, tool-handles, ploughs and upright pieces of Persian-wheels.

ANTHOCEPHALUS CADAMBA Miq.

FAM.—Rubiaceæ.

COM. NS. :—*H.* Hadam, Karam ; *K.* Kadaga, Kadda-vailu, Kadwal ; *M.* Kadamb, Niv ; *Tr.* Kadam.

CHAR. :—A large deciduous glabrous tree with erect trunk and widely spreading horizontal branches ; 12-21 m. high ; girth 1·8-4·5 m. *Bark* dark-grey, with numerous regular longitudinal fissures, the outer bark peeling off in small rectangular scales. *L.*—13-23 cm., ovate-oblong, or elliptic-oblong, coriaceous, glabrous, and shining above, pubescent beneath, acuminate, cordate or rounded at the base, on a short petiole. *Fl.*—orange-coloured, scented, sessile, with large, white, exerted stigmas, arranged in terminal, globose, peduncled heads. *Fr.*—yellow, size of a small orange. *Fl. t.*—Dec.-Mar. *Fr. t.*—rainy season.

DISTR. :—North Kanara in evergreen forests, rare ; common near villages throughout the Konkan but apparently not found wild ; throughout India, often cultivated : Burma, Ceylon, Sumatra, Borneo.

DESCR. OF WOOD :—*Colour* white with yellowish tinge. Even-grained. *Pores* large, oval, elongated, sub-divided, sometimes in short radial lines, scanty. *Med. rays* fine, numerous, close together, bent outwards where they touch the pores. Soft, moderately strong, not durable ; seasons easily, not very prone to cracking and warping, liable to stain if not dried quickly, easy to saw and work to a fine finish. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for tea-boxes, dug-out canoes, yokes, ceiling boards, light construction work, and turning. First on the list of tea-box timbers (Gamble). This has been highly recommended for match-manufacture. Flowers are offered at Hindoo shrines.

This tree deserves more attention as a useful, fast-growing, soft-wooded species (Troupe).

See—Sacred Plants.

ANTIARIS TOXICARIA Lesch.

FAM.—Moraceæ.

COM. NS. :—*E.* Upas tree ; *H.* Chandkuda ; *K.* Ajjanpatte, Bairi, Gajbugri ; *M.* Chandala, Chandkuda, Karwat, Jasund.

CHAR. :—A very tall (gigantic) evergreen tree, buttressed at the base, 30-75 m. high ; girth enormous sometimes reaching 9 m. *Bark* dark coloured, hard, smooth. *L.*—10-20 × 5·5-6 cm., petiolate, elliptic-oblong, acuminate, rounded or cordate at the base, entire, scabrous. *Male fl.*—axillary, crowded on a thick, flat receptacle ; calyx lobes 4 ; stamens 3-8. *Female fl.*—solitary, enclosed in an

involucre of imbricate bracts. Styles 2. *Fr.*—1.8 × 1.3 cm., 1-seeded, red, velvety. *Fl. t.*—Sept.-Oct. *Fr. t.*—cold season.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, common near Yellapur; Western Peninsula: Burma (Pegu, Tenna-serim), Ceylon, Malay Peninsula.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* faintly marked. *Pores* large and moderate-sized, often sub-divided. *Med. rays* moderately broad, undulating, uniform and equidistant; the distance between two rays generally equal to the transverse diameter of the pores, which are prominent on a vertical section. Soft, light. *Wt.*—28 lbs per c.ft.

USES :—It (wood) exudes a white resinous substance, used in poisoning arrows. The nuts are intensely bitter, and contain an azotized principle. The inner bark yields a strong, tenacious fibre of which rope is made. Sacks are also made of this bark to carry rice, the process being described in Graham's *Catalogue of Bombay Plants*, p. 193, thus :—

“A branch is cut, corresponding to the length and diameter of the sack wanted. It is soaked a little, and then beaten with clubs until the *liber* separates from the wood. This done, the sack formed of the bark is turned inside out, and pulled down until the wood is sawed off, with the exception of a small piece left to form the bottom of the sack, and which is carefully left untouched. These sacks are in general use among the villagers for carrying rice.”

Coats or other garments worn by Ghat Kunbis during the Holi festival are also manufactured from the bark. Leaves used to polish wood and ivory. Paper is made of the bast (Brandis).

See—Fibres, Gums and Resins.

ANTIDESMA BUNIOUS Spreng.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Naikuti; M. Amati.

CHAR. :—A small evergreen tree. *Bark* greyish-brown; young shoots hairy. *L.*—variable, 7.5-18 × 3.1-6.2 cm., elongate-elliptic or elliptic-lanceolate, acuminate, glabrous and shining above, base tapering. *Fl.*—reddish, numerous in pubescent spikes; female-spikes simple, male-spikes compound. Male flowers sessile; calyx cupular, shortly 4-lobed. Female flowers on short pedicels; calyx shortly tubular, truncate. *Fr.*—about .9 cm. in diameter, globose-ovoid, smooth, red, turning black. *Fl. t.*—May-June. *Fr. t.*—Aug.-Sept.

DISTR. :—Throughout the Western Ghats; Konkan and N. Kanara in moist forests. Deccan-Khandala ghat (rare). Throughout the hotter parts of India from Nepal to Assam and southwards to Singapore and from Bihar to Ceylon.

DESCR. OF WOOD :—*Colour* red; in appearance similar to that of *A. ghæsembilla*. Hard. *Wt.*—about 46 lbs. per c.ft. (specimen from Darjeeling Terai).

USES :—The leaves and fruit are eaten.

See—Fruit Trees.

ANTIDESMA DIANDRUM Roth.

FAM.—Euphorbiaceæ.

COM. NS. :—*H.* Amari, Amli, Bun-mussureya, Dhakki; *K.* Sana Kulipa.

CHAR. :—A small deciduous tree, 3·6-6 m. high; girth 3·6 m. Bark smooth, grey; inner bark pale red, fibrous; young shoots and petioles pubescent with rust-coloured hairs. *L.*—5·10 × 2·5-5 cm. oblong or ovate, lanceolate, membranous. *Fl.*—greenish-yellow, minute, on short pedicels in axillary and terminal spikes, solitary or 2-3 together; male spikes 5·7·5 cm., female shorter. Calyx 4-7-lobed. Stamens usually 2 or 3. Styles 2. *Fr.*—drupe, obovate, purplish-red, small, succulent, 1-celled. *Fl. t.*—May-July. *Fr. t.*—Aug.-Sept. Leafless in hot season.

DISTR. :—Throughout the State, common in the Konkan and N. Kanara in the moist forests from the coast inland; abundant at Karwar near sea-coast growing on laterite and granite soils. Tropical Himalayas from Garhwal eastwards and southwards to Travancore; Ceylon.

DESCR. OF WOOD :—*Colour* pinkish-grey. Close-grained. *Pores* small and very small, uniformly distributed. *Med. rays* of two sizes, moderately broad and very fine, wavy. *An. rings* marked by a fine line. Hard, smooth; takes a fine polish but is apt to split and warp. *Wt.*—about 50 lbs. per c.ft. (Talbot).

USES :—The fruit, which is acid, is eaten. The leaves are made into chutneys.

See—Fruit Trees.

ANTIDESMA GHÆSEMBILLA Cærtn.

FAM.—Euphorbiaceæ.

COM. NS. :—*H.* Umtoa; *K.* Pullam-Purasi; *M.* Jondhra, Jondhri.

CHAR. :—A small deciduous tree, 6·7·5 m. high; girth 3·6 m. Bark light brown, very thin, granular. Branchlets, young leaves and inflorescence tawny or greyish-pubescent. *L.*—5·10 × 3·1-6·3 cm., oval or obovate, elliptic or nearly orbicular, rounded or slightly cordate at the base. *Fl.*—greenish-yellow in dense panicle spikes; male spikes 1-2 in.; female somewhat shorter, tomentose. Calyx deeply 5-7 parted. *Fr.*—drupe, ovoid, dark-purple when ripe. *Fl. t.*—Apr.-July. *Fr. t.*—Sept.-Oct.

DISTR. :—Throughout the State, in N. Kanara forests. Konkan-Vengurla hills; S. M. Country—Londa; tropical Himalayas from Simla to Bhootan, and southwards to Ceylon and Singapore, Malay Peninsula, China.

DESCR. OF WOOD :—*Colour* red with darker coloured heart-wood. Close and even-grained. *An. rings* indistinctly marked by concentric lines. *Pores* small and moderate-sized, uniformly distributed. *Med. rays* of two sizes, few moderately broad rays with numerous fine rays between them, prominent in the silver-grain. Hard, smooth. *Wt.*—about 46 lbs. per c.ft. (Madhya Bharat).

USES :—Wood adapted for cabinet-work. The fruit is eaten on account of its pulp which is agreeably acid. Leaves are said to be eaten in Bengal. Bark is used for making ropes.

See—Fruit Trees, Fibres.

ANTIDESMA MENASU Miq.

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A small or middle-sized tree; branchlets, petioles, stipules and inflorescence velvety. *L.*—8-16 × 3-6 cm. (sometimes 25 cm. long—Talbot), elliptic-oblong, acuminate (the acumen often very long), glabrous and shining on both sides. *Fl.*—in axillary and terminal, solitary or paniculate racemes, the male and female flowers with short stout pedicels. *Male fl.*—calyx cup-shaped, 4-lobed from above the middle, lobes rounded; stamens 3-4. *Female fl.*—calyx as in male, except the lobes are acute. *Fr.*—ovoid, acute, about .6 cm. *Fl. t.*—Feb.-May. *Fr. t.*—Sept.-Oct.

Var. *linearifolia* Hook f. :—Leaves 7.5-15 × 1.3-4 cm., linear-oblong, shining on both sides.

Western Peninsula from the Konkan and Circars southwards : Burma, Andamans.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara; also along *nalas* in deciduous moist forests. Var. *linearifolia* is common in the Siddapur taluka of N. Kanara.

DESCR. OF WOOD :—Colour dark-red, similar to that of *A. ghæsembilla* but the pores are smaller and the med. rays fine.

USES :—Not known.

APOROSA LINDLEYANA Baill.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Bidchella, Chella, Sali, Surroli.

CHAR. :—A small or middle-sized evergreen tree. *Bark* thin, brown, scaly; inner bark yellowish with wavy red fibres. *L.*—thinly coriaceous, 10-15 × 4.5-6 cm. elliptic-oblong, acuminate, glabrous, base acute or rounded. *Fl.*—yellowish, male flowers sessile; spikes 2.5-4 cm. long, dense. Sepals usually 4, ciliate; stamens 2-3; female flowers in very short, hairy clustered racemes. *Fr.*—dehiscent, about 1 cm. diameter, quite globose, pointed with the style. Seeds plano-convex, broadly ovate. *Fl. t.*—Dec.-Feb. *Fr. t.*—Apr.-Sept.

DISTR. :—Common in the evergreen forests of the Konkan and N. Kanara. Supa on the Kalinadi and Arbail ghat, Western Peninsula. Ceylon abundant. Alt. 1200 m.

DESCR. OF WOOD :—Colour brown. Pores moderate-sized, rather scanty, in short radial strings between the fine, numerous med. rays. Smooth, rather soft. Wt.—48 lbs. per c.ft.

USES :—Wood used for rafters of huts in the Yellapur taluka of Kanara (Talbot). Used for buildings and other purposes (Beddome). Fruit is eaten (Trimen).

See—Fruit Trees.

ARECA CATECHU Linn.

FAM.—Palmeæ,

COM. NS. :—*E.* Areca-or Areca-nut-palm, Betel-nut Tree ; *G.* Hopari, Sopari ; *H.* Supari, Suppiyari ; *K.* Adki, Betta, Chikna, Kaungu, Poga ; *M.* Pophal, Supari.

CHAR. :—A tall tree ; stem quite straight, cylindrical, grey, annulate, the inner part generally hollow ; 12-30 m. high ; girth 20 cm. *L.*—pinnate, 1·2-1·8 m., leaflets numerous, 30-60 cm., upper confluent. Spathe double, compressed. *Fl.*—spadix branched, bearing male and female flowers ; rachis stout ; male very numerous ; corolla petals 3, rigid ; female solitary, 2 or 3 at the base of each ramification of the spadix ; perianth sepals 3, petals 3, rigid, fleshy cordate. *Fr.*—5·8-5 cm. long, smooth, fleshy-fibrous, orange or scarlet. Seed in the upper part. *Fl. t.*—Mar.-Apr. *Fr. t.*—cold season.

DISTR. :—Cultivated in high rainfall tracts. Extensively grown in N. Kanara ; fairly largely in the Konkan. Madras, Bengal, Assam, Mysore, Malabar, Indo-Malaya, Malayan Peninsula and Islands, Burma, Siam. Native of Indo-China.

DESCR. OF WOOD :—*Colour* brownish-grey. Vascular bundles large, brown, forming a hard rind on the outside of the stem, each with a heart-shaped horny part and one pore in the sinus. Outer wood hard. *Wt.*—57 lbs. per c.ft.

USES :—Wood is used for furniture-pins, bows, spear-handles, for scaffolding poles ; stems are hollowed out for water channels. The leaf-sheaths are used to wrap up articles and as paper to write upon. The seeds are the well-known betel-nut (supari), so universally chewed with lime and betel-leaves in India. From the fruits an extract is prepared in some parts of India, which possesses the same properties as the catechu (Kath), the produce of *Acacia catechu*. Seeds are used in turning for necklaces, knobs of walking sticks and other small fancy articles, on account of the reticulated appearance formed by the ruminant lines in the albumen of the nut. Roots, leaves (rarely), fruit and gum are used medicinally.

See—Medicinal Plants.

ARTOCARPUS HIRSUTA Lam.

FAM.—Moraceæ.

COM. NS. :—*E.* Anjeli-wood tree ; *K.* Hebasu, Hebbhalasu, Hebbalsina, Hesswa, Hessain ; *M.* Pat-or Ran-Phanas ; *Tr.* Aini.

CHAR. :—A very lofty evergreen tree attaining height of 60 m. (Brandis), with a trunk of great girth. *Bark* dark-coloured, scaly, young shoots, pedicels and peduncles hirsute with long tawny hairs. *L.*—broadly elliptic or ovate, coriaceous, entire. *Fl.*—on the axillary pedunculate receptacles ; *male* receptacle narrowly cylindric, 10-15 cm. long, at first erect, afterwards pendulous ; *female* ones erect, 11·3 × 8 cm. *Fr.*—size of a lemon, echinate ; spines cylindric, straight, hispid. Seeds ovoid. *Fl. t.*—Jan.-Feb. *Fr. t.*—ripe in May.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara. Deccan-Bhor country. Western Peninsula on the ghats from the Konkan southwards ascending to 1200 m.

DESCR. OF WOOD :—*Colour*—sap-wood white, heart-wood yellowish brown. Close-grained. *Pores* large, sometimes sub-divided, often filled with a white substance. *Med. rays* fine to moderately broad, wavy, very distinct but distant, bent where they meet the pores. Moderately hard; seasons well and easily, model timber in this respect; as strong as teak; fairly durable; easy to saw, turn, finish and polish; does not warp and is not attacked by white ants; stands contact with water well. It has a close resemblance to teak. It is a very superior utility wood of excellent quality. An excellent wood from the working point of view. *Wt.*—36 lbs. per c.ft.

USES :—Wood is much in demand for house and ship-building purposes on the western coast. It makes excellent furniture. It is also used for carriage-building and turnery. It would probably make an excellent parquet floor wood and sell for good prices in block form. Fruit is edible.

See—Fruit Trees.

ARTOCARPUS INCISA Linn.

FAM.—Moraceæ.

COM. NS. :—*E.* Bread-fruit Tree; *M.* Vilayati Phanas.

CHAR. :—A middle-sized tree. *L.*—3-6 m. long, more or less deeply pinnatifid in the upper part, lobes oblong, acute. *Fl.*—male calyx bifid. *Fr.*—round, size of a pummelo, muricated, somewhat like jack-fruit. Seed size of a large pea.

DISTR. :—Cultivated near the coast of Konkan and N. Kanara; the equable humid climate of Bombay seems favourable to it and plants have been grown in the island of Bombay in the gardens. It does not thrive if planted at any distance from the sea. Cultivated in India along the coast. Burma, Ceylon. Native of Pacific Islands.

DESCR. OF WOOD :—Not known.

USES :—Fruit (raw) is cut in slices and eaten as vegetable. Ripe fruit is not palatable. Seeds are eaten roasted; taste like those of chestnut.

See—Food Plants.

ARTOCARPUS INTEGRA Merr.

(ARTOCARPUS INTEGRIFOLIA Linn.)

FAM.—Moraceæ.

COM. NS. :—*E.* Jack-fruit Tree, Jack or Orange Wood; *G.* Vanas; *H.* Chakki, Kanthal, Ranos; *K.* Halasu, Kujja, Panesa, Tage; *M.* Phanas; *Tr.* Jack.

CHAR. :—A large evergreen tree, 12-18 m. high; girth 1-3-3 m. (sometimes more). Glabrous except the youngest parts. *Bark* thick, blackish, deeply cleft when old. *L.*—10-20 cm. long,

coriaceous, elliptic, entire (in young plants sometimes lobed), dark-green and shining above, rough beneath, stipules large. *Fl.*—monœcious; densely crowded on globose one-sexual solitary, axillary receptacles; male receptacle cylindric without bracteoles; female attaining enormous size, 30-75 cm., tubercled; hanging on short stalks from the trunk; anthocarps, pyramidal. Seeds oblong or reniform, starchy, size of a nutmeg. *Fl. t.*—Nov.-Jan. *Fr. t.*—ripe June-Aug.

DISTR. :—Rain forests of Western Ghats, Konkan, often planted along roadsides in N. Kanara; planted near villages in the State; grown in gardens also; widely cultivated.

DESCR. OF WOOD :—*Colour*—sap-wood pale; heart-wood bright-yellow, darkening on exposure. *Pores* moderate-sized to large, often oval, and sub-divided, sometimes filled with a white substance, arranged in irregular patches of soft tissue, which are occasionally elongated concentrically and sometimes confluent, prominent on a vertical section. *Med. rays* well marked, moderately broad, not numerous. Moderately hard, strong; seasons easily without trouble or degrade; fairly durable; easy to work; an ornamental wood and takes a fine polish. *Wt.*—40 lbs. per c.ft. Jack wood is nevertheless an excellent wood if supplies are forthcoming.

USES :—The chief importance of the tree lies in its fruit for which it is extensively cultivated. Wood used for house-building, boats, masts, oars, carts, waggons, carriages, yokes, naves, spokes and felloes, rice-pounders, cooper's work, well-construction, drums, brush-backs; excellent for furniture, cabinet-making, boxes, turnery and general carpentry, for which purposes it is sometimes exported to Europe. Wood gives yellow dye. Bark yields a transparent gum. Rubber is contained in the sticky juice (latex) of the plant. The ripe fruit is eaten and the sticky juice is used as bird-lime. Leaves, fruits and seeds are used medicinally. Leaves and rind of the ripe fruit are fed to cattle.

See—Medicinal Plants, Fruit Trees, Dyes and Tans, Gums and Resins, Fodder Plants.

ARTOCARPUS LAKOOCHA Roxb.

FAM.—Moraceæ.

COM. NS. :—*H.* Barhat, Dahu, Dhau, Lakuch; *K.* Wonta, Watchuli; *M.* Badhar, Wotomba; *Tr.* Lakooch.

CHAR. :—A large deciduous tree, 12-18 m. high; girth 1·8-3 m. *Bark* rather thick, dark grey, rough. Branchlets and under side of leaves downy. *L.*—15-25 × 5-15 cm., oval or ovate or oblong-ovate, obtuse or short-acuminate, coriaceous, glabrous and shining above and soft tomentose below. *Fl.*—Aments of both sexes on very short peduncles, axillary and solitary, the male generally on the lower axils, irregularly roundish or oblong, yellow, size of a nutmeg; female on the upper axils. *Fr.*—size of a man's fist, sometimes larger, soft-pubescent, yellow when ripe. *Fl. t.*—May-Apr. *Fr. t.*—July-Aug.

DISTR. :—Evergreen forests of the Konkan and N. Kanara, common in the forests near Yellapur; tropical Himalayas from Kumaon eastwards to Burma and southwards to Travancore.

DESCR. OF WOOD :—*Colour*—sap-wood large, white, soft, perishable; heart-wood yellow, turning dark-brown. *Pores* large, enclosed in rings of light coloured, soft tissue, uniformly distributed, often filled with a white substance. *Med. rays* fine and moderately broad, distinct, not numerous. Hard, rather strong, fairly durable; easy to saw, plane and finish; seasons easily. *Wt.*—40 lbs. per c.ft. Very similar to jack wood in appearance. It resists white-ants. Said to resist Teredo (ship-borer), a statement which requires verification.

USES :—Wood used for house-posts, beams, rafters, piles in water, dug-out canoes, oars, well-construction, sugar-mills, furniture. Lakooch is popular for house-construction and medium weight furniture. It is a valuable wood and is much prized in the Andamans for piers and jetty-piles, posts and rafters. The male flower-heads are pickled; the fruits are acid and are eaten. Leaves are fed to cattle.

See—Fruit Trees, Fodder Plants.

ATALANTIA RACEMOSA W. & A.

FAM.—Rutacœ.

COM. NS. :—*E.* Wild lime; *K.* Adwi Nimbe; *M.* Makad or Ran Limbu.

CHAR. :—A shrub or a small tree; spines strong and sharp, sometimes absent. *L.*—1-foliolate; leaflets 5-10 × 2.5-4 cm., elliptic, rounded at the apex, emarginate, entire or crenulate, glabrous, reticulately veined, base acute. *Fl.*—in axillary racemose cymes; pedicels short; bracts minute, subulate. Calyx usually 4-sometimes 3-5-lobed; lobes rounded or subacute, ciliolate. Petals white, broadly elliptic or obovate, very concave in bud, not adnate to the staminal tube, glandular. Stamens 8; filaments usually united into a tube throughout nearly their entire length, sometimes united at the base only when they are linear and flattened. Anthers large, cordate, attached at the back near the base on the triangular teeth of the staminal tube or the triangular apex of the filaments. Disk cupular. Ovary ovoid, oblong or obovoid. Style short, stout, somewhat clavate. *Fr.*—berry, globular, 2 cm. in diam. *Fl. t.*—Nov.-Dec. *Fr. t.*—Apr. (ripe).

DISTR. :—Tolerably abundant at Mahabaleshwar and Matheran, Khandala, Raigad, Parghat, Ambolighat; common in some of the N. Kanara forests; gregarious in the evergreen forests near Ainsli ghat; Western India from Konkan to Ceylon.

DESCR. OF WOOD :—*Colour* yellow. Close-grained. *Pores* very small; single or in pairs in radial lines. *Med. rays* very fine, numerous, the distance between the rays greater than the transverse diameter of the pores. Numerous white concentric lines at varying distances. Hard and heavy. *Wt.*—60 lbs. per c.ft. Much resembles the wood of *M. exotica*.

USES :—Suitable substitute for boxwood work, engraving work, cabinet work and turning.

AVERRHOA BILIMBI Linn.

FAM.—Oxalidaceæ.

COM. NS.:—*H. Anvalla*, *Bhimbu*; *M. Bilimbi*.

CHAR.:—A small tree, 4·5-6 m. high. *L.*—imparipinnate; leaflets 11-35 entire, 4·5 × 2 cm., oblong, more or less pubescent on both surfaces, base usually rounded, somewhat oblique. *Fl.*—from the trunk and branches; panicles villous. Sepals ovate-lanceolate, acute, pubescent. Petals oblong, spathulate, more than twice as long as the sepals. *Fr.*—oblong, obtusely lobed. Seeds exarillate. *Fl. t.*—Mar.-May. *Fr. t.*—rainy season.

DISTR.:—Cultivated in Konkan and N. Kanara, and in gardens throughout India, but much more rarely than *A. carambola*.

DESCR. OF WOOD:—*Colour* white. Even-grained. *Pores* small or moderate-sized, sometimes sub-divided, very scanty. *Med. rays* extremely fine and indistinct, numerous, faint pale concentric regular bands. Tough, soft. *Wt.*—35 lbs. per c.ft.

USES:—Same as *A. carambola*.

See—Dyes, Fruit Trees.

AVERRHOA CARAMBOLA Linn.

FAM.—Oxalidaceæ.

COM. NS.:—*E. Carambola* Apple, Coromandel Gooseberry; *G. Kamarkh*; *H. Kamrak*, *Kamarang*; *K. Kirahulli*, *Darchulli*; *M. Kamarakh*, *Karmare*.

CHAR.:—A small tree with close drooping branches. *Bark* grey with horizontal folds. *L.*—alternate, imparipinnate, leaflets 5-11, irritable to the touch, 4·6·5 × 2·3·2 cm., ovate-oblong, acuminate, entire, glabrous or pubescent above, glaucous and glabrous beneath, base oblique, acute. *Fl.*—in short racemes, chiefly axillary or sometimes springing from the bark. Sepals glabrous. Petals more than twice as long as the sepals, oblong-obovate, variegated white and purple. Stamens 10, of which 5 are shorter and without anthers, or sometimes 1 or 2 of these longer and antheriferous; filaments dilated at the base. *Fr.*—oblong, acutely angled, yellow. Seeds arillate. *Fl. t.*—May-Aug. *Fr. t.*—cold season.

DISTR.:—Cultivated throughout the State; run wild in some of the forests near villages in N. Kanara; cultivated in many parts of India and the Tropics. Perhaps a native of Malaya.

DESCR. OF WOOD:—*Colour* white, turning light red. Close-grained. *Pores* moderate-sized, often sub-divided, or disposed in short, radial lines, scanty, prominent on a vertical section. *Med. rays* very fine, very numerous and regular, somewhat indistinct. Moderately hard. *Wt.*—37 lbs. per c.ft.

USES:—Wood used for building purposes and furniture in Sundribans. Ripe fruits made into jams, jellies, or eaten in stews, puddings or tarts. The juice is used to remove iron mould stains from linen. Unripe fruits used in dyeing.

See—Dyes and Tans, Fruit and Trees.

AVICENNIA OFFICINALIS Linn.

FAM.—Verbenaceæ.

COM. NS.:—E. White Mangrove; K. Ipati; M. Tiwar.

CHAR.:—A small tree. *Bark* thin, greyish-brown. *L.*—4·7-5 cm., elliptic-lanceolate, obovate-acuminate, tapering into a petiole 3-5 lin, coriaceous, entire, glabrous above, clothed with a white minute tomentum beneath. *Fl.*—yellow, fragrant, sessile, small, in terminal heads. *Calyx* lobes 5, corolla segments 4. *Fr.*—capsule, ovate, compound, acuminate, 2-valved, 1-seeded. Seed usually germinating on the tree. *Fl. t.*—Apr.-June. *Fr. t.*—July-Aug.

DISTR.:—Common in the salt marshes, and along the banks of tidal rivers and creeks, throughout the Konkan and N. Kanara. Mangrove swamps of the Deccan Peninsula and India, Ceylon, Burma, Andamans and Nicobar.

DESCR. OF WOOD:—*Colour* brown or grey. Alternate layers of pore-bearing tissue and loose large-celled tissue without pores; the former layer shows the large moderate-sized or small *pores* in radial strings of 1 to 5 between the fine short *med. rays*; the latter is much narrower and darker, forming belts which occasionally join each other, so that the layers are clearly not the annual growths. Hard, brittle. *Wt.*—52 lbs. per c.ft.

USES:—Wood used only as fuel in India. For inferior beams and door frames (Sundribans), house posts (Chittagong), mills for husking paddy, rice-pounders and oil-mills (Andamans).

AZADIRACHTA INDICA Juss.

(MELIA AZADIRACHTA Linn.)

FAM.—Meliaceæ.

COM. NS.:—E. Neem or Margosa tree; G. Limbada, Limbra; H. Nim, Nimla; K. Bevu, Nimba; M. Balant-Nimb, Kadulimb.

CHAR.:—A moderate-sized to large tree, 12-15 m. sometimes 24 m. high, girth 1·8-2·7 m. *Bark* grey, with numerous scattered tubercles. *L.*—imparipinnate, approximated near the ends of the branches, 20·8-39 cm. long. *Leaflets* 9-15, 2·6-7·8 × 1·34-4 cm., opposite, sub-opposite or alternate, ovate-lanceolate, unequal-sided, oblique or sub-falcate, acuminate, serrate, glabrous, very shortly petioluled. *Fl.*—small, white, honey-scented, on short puberulous pedicels arranged in large, solitary, axillary panicles shorter than the leaves. *Calyx* lobes 5, minute, rounded. *Petals* 5, shortly ciliate. *Staminal tube* as long as the petals. *Anthers* 10 opposite the teeth of staminal tube. *Ovary* 3-celled. *Fr.*—drupe, oblong, size of an olive, yellowish-green, stone almost always 1-celled, 1-seeded. *Fl. t.*—March-May. *Fr. t.*—rainy season. Sheds leaves—hot season; new leaves—Mar.-Apr.

DISTR.:—A common tree growing throughout the greater part of India in the dry region; usually planted along roadside; also self-sown. In dry forests of the Karnatak and parts of the Deccan; Dry land forests of Burma.

DESCR. OF WOOD :—*Colour*—sap-wood grey, heart-wood red. Close-grained. *An. rings* doubtful; shows alternating bands with numerous and with fewer pores; also pale concentric lines. *Pores* scanty moderate-sized and large, often oval and sub-divided, visible on a vertical section. *Med. rays* fine, numerous, white, bent outwards where they touch the pores; the distance between the rays less than the transverse diameter of the pores. Hard, scented, durable, resembling mahogany; takes fine polish; owing to bitterness not attacked by white ants. *Wt.*—51 lbs. per c.ft.

USES :—Wood used for house-building (posts, beams, door and window frames), furniture, carts and their parts, ship and boat-building, ploughs, oilmills, cigar-boxes and carved idols. Bark, gum, leaves and flowers are all used in medicine, while the seeds yield an oil (*neem* or *margosa* oil) used in medicine, for soap making and burning.

See—Medicinal Plants, Oils, Gums and Resins.

BACCAUREA COURTALLENSIS Muell.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Koli-Kuki.

CHAR. :—A large or middle-sized tree; young parts minutely pubescent. *L.*—7·5-20 × 3·1-7·5 cm., elliptic, shortly acuminate, glabrous, base acute. *Male fl.*—very small, reddish, in racemose panicles, 18-25 cm. long, much crowded on the trunk, pedicels crowded in little clusters of 3-7 together; sepals 4-6, stamens 5-10. *Female fl.*—twice as large as the males, in simple racemes 20-30 cm. long, irregularly arranged along the rachis; sepals usually 5. *Fr.*—sub-globose about 2·5 cm. in diameter, rough, with 3 prominent ridges from the apex to the base; bright crimson when ripe, hanging in great profusion, which appears as a crimson mass. *Fl. t.*—cold season.

DISTR. :—North Kanara in the moist forests near Sungsal; Travancore and Anamalais.

DESCR. OF WOOD :—*Colour* white. *Pores* small, scanty, often in radial strings. *Med. rays* moderately broad, numerous, showing a neat silver-grain. Hard. *Wt.*—40 lbs. per c.ft. (Travancore).

USES :—Uses of wood not known. Fruit is edible, being pleasantly acid.

See—Fruit Trees.

BALANITES ROXBURGHII Planch.

FAM.—Simarubaceæ.

COM. NS. :—H. Hingu, Hingan, Hingol, Hingota, Inqua; K. Ingiluka, Ingiludagida; M. Hingan, Hinganbet.

CHAR. :—A shrub or a small tree. *Bark* yellow or cinerous (Talbot), grey (Gamble), thick; in favourable circumstances grows to a height of 9 m. with an erect trunk, 6 or more m. in girth.

All young parts greyish pubescent, armed with very strong, sharp, ascending, solitary spines, frequently bearing leaves and flowers. *L.*—bifoliolate, in short petiole. Leaflets 2·6-4 cm., elliptic or obovate, entire, puberulous, shortly petioluled, coriaceous. *Fl.*—greenish-white, fragrant, in axillary 4-10 flowered cymes. Sepals and petals 5, ovate, tomentose within, imbricate. Stamens 10, inserted at the base of a thick, conical disc. Ovary entire. *Fr.*—drupe, woody, ovoid, about 5·2 cm. long, 5-grooved, with a smooth, light-grey rind. Nut hard, 1-seeded, imbedded in an offensive smelling, greasy pulp. *Fl. t.*—Apr.-May. *Fr. t.*—Dec. Leafless in cold season; new leaves in Mar.

DISTR. :—Throughout the driest parts of the State and open situations. Common in Gujarat (Panch-Mahals, Kaira), Cutch, Bihar, Madhya Pradesh, Sikkim and other dry parts of India. Burma. It is characteristic of black-cotton soil (Gamble).

DESCR. OF WOOD :—*Colour* yellowish-white. No heart-wood. No *an. rings*. *Pores* small or moderate-sized, scanty, distributed in irregular bands and groups. *Med. rays* short, moderately broad, on a radial section visible as narrow plates, the pores being all well marked as wavy lines on that section. Moderately hard. *Wt.*—48 lbs. per c.ft.

USES :—Used for walking sticks and fuel. Seeds give a fixed oil. Pulp is used to clean silk in Rajasthan. The hard nut is employed in fire-works; the kernel, being scooped out through a small hole and filled with gun-powder, explodes with loud report. The bitter bark, leaves and seeds are much used by *hakims*.

See—Oils.

BAMBUSA BAMBOS Voss.

(BAMBUSA ARUNDINACEA Willd.)

FAM.—Gramineæ.

COM. NS. :—*E.* Spiny or Thorny Bamboo; *G.* Tonear, Wang; *H.* Bans, Kota, or Magar-or Mal-bans; *K.* Bidiru, Gale, Hebbidru, Kalale; *M.* Kalak, Bamboo.

CHAR. :—A tree, thorny; stems many, tufted on a stout root-stock, 24-30 m. high with 15-17·5 cm. in diameter, usually graceful and curving; nodes prominent (the lowest rooting); the lower emitting horizontal, almost naked shoots armed at the nodes with 2-3 stout recurved spines, sometimes 2·5 cm. or more long; internodes up to 45 cm. long; stem-sheath coriaceous, variable in shape, striate, rounded tip and plaited margin; when young orange-yellow streaked with green or red and thinly ciliate with golden hairs. *L.*—up to 13·20 × 2·5 cm., linear or linear lanceolate, margin scabrous, base rounded; leaf-sheath ending in a thick callus; ligule short. *Fl.*—an enormous panicle, branchlets bearing loose clusters of spikelets. *Fl. t.*—after irregular intervals of 30 years or less.

DISTR. :—Along the banks of rivers and *nalas* is moist monsoon forests. Dangs, Konkan, W. Ghats, Deccan and N. Kanara. Throughout India (except the Himalayas), Burma and Ceylon. Often cultivated.

DESCR. :—Magnificent species; soft-wooded, stout. *Wt.*—45 to 50 lbs. per c.ft.

USES :—Used for building, mats, baskets. Used for paper manufacture. Seeds used as food-grain in times of scarcity. Roots, leaves, stem, sprouts, seeds and manna used medicinally.

See—Medicinal Plants, Fibres, Famine Plants.

BAMBUSA VULGARIS Schrad.

FAM.—Gramineæ.

COM. NS. :—*E.* Yellow or Green-striped Bamboo; *M.* Kalak, Vansa-Kalak, Udha-bans.

CHAR. :—An unarmed tree, stems 6-15 m. high by 5-10 cm. in diameter, rather distant, green, yellow or striped; nodes hardly raised; internodes, 25-45 cm. long; stem-sheaths 15-25 × 17·5-22·5 cm., the top rounded, retuse. *L.*—15-25 × 1·8-2·2 cm., pale linear-lanceolate, petiolate, 6-8 nerved; leaf-sheaths striate, laxly hairy; ligule short, ciliate. *Panicle* large, leafy. Spikelets in bracteate clusters of 3-10.

Var. *striata* Gamble—Rather small in size. Very handsome variety.

DISTR. :—Cultivated in Bombay, Poona, Satara, Kolhapur, Konkan. Not indigenous. Commonly cultivated in various places in India. Indigenous in Ceylon, China and Japan.

USES :—Same as other bamboo species.

BARRINGTONIA ACUTANGULA Gærtn.

FAM.—Lecythydaceæ.

COM. NS. :—*E.* Small Indian Oak; *G.* Samudraphala; *H.* Hijgal, Panniari, Samudraphal; *K.* Kolekanva, Mavinkumbia; *M.* Ingli, Niwar, Samudraphal, Tiwar.

CHAR. :—A small evergreen tree 10-15 m. high; girth 1·2-1·5 m. *Bark* 1·3 cm. thick, dark brown, rough, glabrous. *L.*—7·5-13 × 5 cm., short-petioled, cuneate-elliptic or obovate-oblong, entire or serrulate, coriaceous, occasionally pubescent. *Fl.*—pink, smaller than in *B. racemosa*, arranged in long, often about 30 cm. long, pendulous racemes at the ends of the branches, sometimes downy. *Calyx* 4-cornered, the limb 4-lobed. Corolla—petals 4, pink. Stamen filaments many, long, red. *Fr.*—2·5-4 × 1·3 cm., oblong, 4-angled, angles rounded. *Fl. t.*—Apr.-May. *Fr. t.*—Oct.-Nov.

DISTR. :—In swampy places. Banks of rivers and streams throughout N. Kanara and Konkan. Common near the coast, throughout India. Ceylon, Malaya, N. Australia.

DESCR. OF WOOD :—*Colour* white, shining. Even-grained. *Pores* small, often in short radial groups between the broad and very broad, rarely fine and moderately broad long *med. rays* which form the greater part of the wood, and show a handsome silver-grain on radial section. Moderately hard, tough, strong, durable; requires

to be well seasoned before use to prevent warping. Wt.—39 lbs. per c.ft.

Wood turns black when buried in mud. (Beddome).

USES :—Wood used for boat-building, well-construction, carts, rice-pounders and cabinet making. Root, bark, leaves, fruits used medicinally. Bark is used to intoxicate fish and also for tanning.

See—Medicinal Plants, Fish Poisons, Dyes and Tans.

BARRINGTONIA RACEMOSA Blume.

FAM.—Lecythidaceæ.

COM. NS. :—*M. Nivar.*

CHAR. :—A moderate-sized, evergreen tree, 12-15 m. high; girth 1.2-1.5 m. Bark grey, glabrous. L.—25 × 7.5 cm., cuneate, oblong, or cuneate-lanceolate, coriaceous, crenulate, shortly acuminate, rounded at the base. Fl.—showy, pink or pale rose-coloured, on slender pedicels forming lax pendulous racemes, 30-45 cm., arising laterally from the ends of the branchlets. Calyx tube turbinate, lobes ovate. Fr.—ovoid-oblong, 4.6 × 2.5-1.3 cm., obscurely quadrangular when ripe, smooth. Fl. t.—Apr.-May. Fr. t.—rainy season.

DISTR. :—Along rivers and *nalas* near the coast of the Konkan and N. Kanara, Western coast, Ceylon, Andaman Islands.

DESCR. OF WOOD :—Colour white. Pores small and moderate-sized, numerous, uniformly distributed. Med. rays moderately broad, long, equidistant. Very soft, porous. Wt.—27 lbs. per c.ft.

USES :—Used as fire-wood.

BAUHINIA PURPUREA Linn.

FAM.—Cæsalpinaceæ.

COM. NS. :—*H. Kandan, Kaniar, Khaiswal, Sona ; K. Sarul, Kanchivala ; M. Devakanchan, Raktakanchan.*

CHAR. :—A moderate-sized, evergreen, usually bushy tree, 6-9 m. high, branches stout, glabrescent. Bark ash-coloured to dark-brown. L.—10-12.5 cm. broad, roundish, about as long as broad, divided 1/3-1/2 the way down into 2 obtuse lobes, glabrous above, faintly hairy beneath, base cordate, petioles 2.5-4 cm. long. Fl.—fragrant, in terminal and axillary few-flowered corymbose racemes, buds fusiform, pubescent. Calyx pubescent, tube slightly dilated upwards; limb about 2.2 cm., splitting into 2 segments slightly divided at the apex into 3 short teeth. Corolla petals 4.5 × 1.3 cm., oblanceolate, acute, with a long claw, white, rose or purple. Fertile stamens 3 to 4; filaments as long as the petals. Fr.—pod, 15-30 × 2 cm., sub-woody, flat, pointed at both ends; seeds 12-16, oblong-ellipsoid, compressed, brown. Fl. t.—Sept.-Nov. Fr. t.—Jan.-Apr.

DISTR. :—Cultivated throughout the State in gardens. Wild in dry forests of the Deccan and Konkan (Talbot and Woodrow). Sub-Himalayan tract from the Ravi eastwards extending to 1,500 m., Southern India, Madhya Bharat, Bengal: Burma.

DESCR. OF WOOD :—*Colour* pinkish-white, turning dark-brown on exposure, wavy concentric bands of soft tissue alternating with dark coloured bands of firm tissue. *Pores* moderate-sized, mostly oval, sub-divided, usually in the soft bands. *Med. rays* pale, fine, uniform and equidistant, prominent in the bands of firm tissue. Moderately hard. *Wt.*—45 lbs. per c.ft.

USES :—Wood is used for agricultural implements and for construction when large enough. Bark used for tanning; flower buds used as pickle; leaves for cattle fodder.

See—Dyes and Tans, Fodder Plants.

BAUHINIA RACEMOSA Lam.

FAM.—Cæsalpinaceæ.

COM. NS. :—*H.* Ashta, Dhorara, Gurial, Kachnal, Makkuna; *K.* Apta, Banne; *M.* Apta, Seyara.

CHAR. :—A small deciduous tree, 6-9 m. high; girth .9-1.2 m. *Bark* blackish, very rough, with deep vertical cracks. Branches drooping. *L.*—cordate at the base, deeply cleft, broader than long, with rusty or grey tomentum on the under surface. *Fl.*—whitish-yellow, in short-peduncled lax racemes, terminal or leaf-opposed, 7.5-15 cm. long; pedicels shorter than calyx. Calyx tube turbinate. Corolla petals oblanccolate. Stamens 10, all fertile. *Fr.*—pod, 12.5-30 cm. × 2.5 cm. thick, falcate, 12-20 seeded. *Fl. t.*—Mar.-June. *Fr. t.*—Nov.-Mar. Sheds leaves Dec.-Jan.; new leaves Mar.-June.

DISTR. :—Common throughout India in deciduous forests. Ghats and hilly parts of Konkan, Deccan (Poona Dist.), Burma, Ceylon, China.

DESCR. OF WOOD :—*Colour* brown with irregular dark patches near the centre; in alternate, concentric, wavy bands of dark hard tissue and pale soft tissue, of nearly equal widths, the soft bands anastomosing. *Pores* moderate-sized, scanty and irregularly scattered, radially sub-divided, or in short radial lines, surrounded by rings of soft tissue, and usually in soft bands. *Med. rays* numerous, very fine, uniform and equidistant, silver-grain faint, but the alternate bands characteristic on vertical sections. Hard. *Wt.*—About 46 lbs. per c.ft.

USES :—Wood used for agricultural implements; good fuel. Bark gives strong fibre suitable for durable ropes; also affords slow matches for match-lock men. (Brandis).

See—Fibres.

BAUHINIA VARIEGATA Linn.

FAM.—Cæsalpinaceæ.

COM. NS. :—*G.* Kovidar; *H.* Kachnar, Kaniar, Pedrian; *K.* Arisingalinga, Kangivala, Utipe; *M.* Kanchan.

CHAR. :—A medium-sized deciduous tree, young shoots brown and pubescent. *Bark*—grey with vertical cracks. *L.*—10-15 cm. long

and as broad, cleft $1/4$ to $1/3$ into two obtuse lobes, base deeply cordate. *Fl.*—in racemes, large, fragrant, white or purplish. Corolla petals 5, 6.3 cm. long, clavate with broad claws all white or 4 purple and fifth darker. *Fr.*—pod, $15.20 \times 1.8.2.5$ cm., flat, dehiscent. Seeds 10-15. *Fl. t.*—Feb.-Apr. *Fr. t.*—Nov.

DISTR. :—Cultivated throughout the State, often as a road-side tree; not indigenous; sub-Himalayan tract and outer Himalayas of the Punjab from the Indus eastwards, Kumaon, Sikkim. Burma, China.

DESCR. OF WOOD :—*Colour* greyish-brown with irregular patches of harder and darker wood in the centre; alternate, more or less concentric, wavy, broken and anastomosing bands of dark firm tissue and slightly lighter soft tissue. *Pores* scanty, often subdivided, moderate-sized to large, in rings of soft tissue and usually in the soft belt. *Med. rays* numerous, fine, rather indistinct, silver-grain inconspicuous, but pores well marked on vertical sections. Moderately hard. *Wt.*—44 lbs. per c.ft.

USES :—Wood is used for agricultural implements. Root, bark and flowers used medicinally. Bark used for tanning and dyeing. Leaves and flower-buds used as vegetable.

See—Medicinal Plants, Dyes and Tans, Food Plants.

BEILSCHMIEDIA FAGIFOLIA Nees.

FAM.—Lauracæ.

COM. NS. :—K. Kamatti.

CHAR. :—A large evergreen tree, 6-9 m. (sometimes more) high; girth $1.2.2.4$ m. *Bark* thin, grey, scaly; inner bark yellowish, woody. *L.*—coriaceous, $8.8.12.5 \times 4.5$ cm., elliptic-lanceolate, acute, glabrous, smooth and shining above, closely reticulately veined beneath; base tapering. *Fl.*—whitish in short axillary panicles; pedicels thickened in the fruit; perianth segments oblong, rounded at the tips, gland dotted. *Fr.*—3.4 cm. long, ovoid, like a plum, dark blue with much white powdery bloom. *Fl. t.*—cold season. *Fr. t.*—hot season.

DISTR. :—Deccan Peninsula on the ghats from the Konkan southwards. Evergreen forests of the Konkan and N. Kanara ghats.

DESCR. OF WOOD :—*Colour* light brown, shining; heart-wood streaked with red. Even-grained. *Pores* moderately large, simple or divided, equally distributed. *Med. rays* fine, uniform, reddish. Moderately hard, smooth. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for buildings and for boats.

BISCHOFIA JAVANICA Blume.

FAM.—Euphorbiacæ

COM. NS. :—*E.* Red Cedar; *H.* Kaen, Korsa, Pun, Irum; *K.* Gobra, Nairul, Nilimara, Nugallu; *M.* Boke; *Tr.* Bishop Wood.

CHAR. :—A large deciduous tree with a tall, erect, cylindric trunk, 9-12 m. high (sometimes 21 m.). Branches spreading, forming a large shady head. *Bark* rough, dark grey with a brown tinge, exfoliating in angular scales. *L.*—3-(rarely) 5-foliolate, 20-30 cm., of which the common peduncle measures 7·5-15 cm., leaflets 7·5-15 × 3·7·5 cm., short-petiolulate, elliptic-lanceolate, long-acuminate, crenate. *Fl.*—greenish; male small on short pedicels in axillary panicles; female on stronger pedicels in branched panicles or simple racemes. *Fr.*—drupe, size of a small cherry, fleshy, round, bluish-black, 3-4 celled. Seeds 3-4, smooth shining, brown. *Fl. t.*—Feb.-Mar. *Fr. t.*—May-June.

DISTR. :—Common on the Chorla ghat, S. M. Country, Konkan. Evergreen forests of N. Kanara ghats (common); chiefly along the streams and shady ravines. Tropical Himalayas from Kumaon eastwards and from Assam southwards, Nilgiris, Ceylon.

DESCR. OF WOOD :—*Colour* red; heart-wood darker having a strong scent of vinegar when freshly cut. Straight-grained with even texture. *Pores* moderate-sized to large, often sub-divided or in short radial lines, sometimes filled with resin. *Med. rays* of two classes, broad and fine, several fine rays between each pair of broad, wavy, dark-coloured ones. Moderately hard, rough; as strong as teak; moderately durable. Sap-wood treats readily, but heart-wood very refractory to preservative treatment. Easy to saw and work to a fine finish; takes good polish; kiln seasoning presents no difficulties. *Wt.*—45 lbs. per c.ft.

USES :—Wood used for planking for floors, walls and ceilings, piles, railway sleepers, bridges, dug-out canoes, oars, well-construction, yokes and wheel-spokes.

BORASSUS FLABELLIFER Linn.

FAM.—Palmeæ.

COM. NS. :—*E.* Brab tree, Fan-Desert—or Palmyra-Palm; *G.* Tad; *H.* Tad; *K.* Karilale, Ola, Talimara; *M.* Tad.

CHAR. :—A large dioecious erect palm, 12-18 or even up to 30 m. in height; girth 1·5-1·8 m. at the base; swollen above the middle and again contracted upwards; when young covered with dry leaves, when old marked with semi-circular scars of fallen leaves. *L.*—fan-shaped, ·9-1·5 m. across, ·4-·8 m. long, shining, folding along the midrib and united to half their length, and bifid at the apex; petiole ·4-·8 m. long with spiny borders. Spathes several, incomplete. *Fl.*—pink and yellow. Male flowers in drooping, stout, cylindrical catkins, arising in pairs of threes from the branches of the spadix; calyx and corolla 3-cleft; stamens 6, inserted in the corolla tube, no rudiment of ovary. Female flowers larger, greenish in paniculate spikes; calyx and corolla 8 or 12 segments, closely imbricate, all similar in colour; sterile stamens 6. *Fr.*—globose or obovoid, dark-brown, with a tinge of yellow, shining, 15 cm. in diameter or more. *Fl. t.*—Mar.-Apr. *Fr. t.*—May. The tree is said to live over 150 years.

DISTR. :—Coastal districts, cultivated. Very common in the coast districts of Ratnagiri, Kolaba and Thana. Planted and self-sown throughout the plains of India, Uttar Pradesh, South India. Burma, Ceylon, Indian Archipelago. Native of Tropical Africa.

DESCR. OF WOOD :—Wood hard, black outside, light-brown and soft inside, but not hollow. Fibrovascular bundles black, rounded; the horny part cordate in section, with one large pore in the sinus; on a vertical section the wood is handsomely streaked. Hard portion is durable. *Wt.*—about 50 lbs. per c.ft.

USES :—The hard outer wood is used for posts, rafters, and buildings. The hollowed-out stems are used as water pipes, and split in half for gutters and open water-channels. The stem-base is hollowed out and made into water buckets. Leaves are used for thatching, mats, umbrellas, fans, hats, sandals, basket-work and for writing with iron styles and preserved for years. The pulp of the fruit, which resembles natural jelly, is eaten and is made into preserves in Ceylon. The chief product is the sweet sap which runs from the peduncles cut before flowering; sap is fermented into toddy or made into "Jaggery". (The female tree gives one and half times more sap than the male one). The fibrous web at the base of young leaves is used for straining toddy and to make torches. The fibres from leaf-stalks and midribs of leaves are used for brush-making. The young seedlings are dug up and eaten as vegetables after cooking or else ground into flour. Root, leaves, flowers, fruit and juice are used medicinally. The nuts yield oil, and may also be roasted and eaten.

*See—*Medicinal Plants, Food Plants, Fibres, Liquors, Oils.

BOSWELLIA SERRATA Roxb.

FAM.—Burseraceæ.

COM. NS. :—*E.* Incense tree; *H.* Salar, Salga, Salhe; *K.* Dhupa, Chitta, Maddi; *M.* Salai, Salphali; *Tr.* Salai.

CHAR. :—A moderate-sized deciduous tree, about 9 m. high and girth of about 1.5-1.8 m. *Bark* 1.34 cm. thick, yellow or greenish-yellow, exfoliating in small hard irregular flakes or thin plates. *L.*—alternate, 20.8-30 cm., imparipinnate near the ends of branches. Leaflets 17-31, 6-7 lin., opposite or nearly opposite, lanceolate-oblong, or ovate-lanceolate, rounded or obtuse at the apex, oblique at the base, coarsely serrate, sometimes entire, sessile or sub-sessile, sparingly pubescent, specially when young. *Fl.*—white, about .07 cm. diam., in axillary or terminal racemes, shorter than leaves. Calyx segments 5-7. Corolla petals broad-ovate, narrowed at the base into a claw. Disc red crenate. Stamens about 10, inserted at the base of the disc. Anthers hairy. Ovary 3-celled; stigma 3-lobed. *Fr.*—capsule, 1.34 cm. long, trigonous, separating septicidally into 3 valves. *Fl. t.*—Feb.-June. Sheds leaves Mar.-Apr.; new foliage in June.

Var. glabra Hook. f.—Glabrous; leaflets entire or nearly so, rounded at the apex.

DISTR. :—Very abundant on the Satpudas, also in Khandesh forests. Common in the Deccan dry hills, Poona; and Belgaum; forests at the foot of the Himalayas as far west as the Sutlej; Madhya Bharat, from Rajasthan to Bihar.

DESCR. OF WOOD :—*Colour*—sap-wood white, heart-wood brown, sometimes very small, so that the wood has been described as white, but when present rather handsome; often streaked in darker and lighter bands. *Pores* scanty, moderate-sized, often sub-divided, often containing resin. *Med. rays* moderately broad, very short, not very numerous. Sap-wood is not prone to splitting or cracking but the heart-wood is very refractory and difficult to season. Kiln-seasoning is definitely recommended for this wood; Coarse, open-grained, not strong, not durable. Easy to saw and work and needs careful handling to bring to a good surface. *Wt.*—about 36 lbs. per c.ft.

USES :—Wood used for inferior planking, well-construction, water-pipes, cheap furniture, rough packing-cases, mica-boxes (Bengal), sheaths of knives and swords, matches, toys (C.B.), boards and cooper's work (Madras). Wood also used as fuel and for charcoal. Foliage is said to be used as cattle fodder; leaves are said to be used as a healing medicine in cases of scalds and burns. It is proposed to use this wood for paper manufacture at the Nepa Factory in Madhya Pradesh.

Gum resin is used for incense.

See—Medicinal Plants, Fodder Plants, Gums and Resins.

BRIDELIA RETUSA Spreng.

FAM.—Euphorbiaceæ.

COM. NS. :—*G. Asana*, Ekalkanto, Manj; *H. Gauli*, Kaj, Kassikhana; *K. Asana*, Garige, Goge, Havugandha, Hasinage, Mullu or Siru Honne; *M. Asana*, Gunjan, Patharphoda.

CHAR. :—A moderate-sized deciduous tree, 9-15 m. high; girth 1.5-1.8 m. *Bark* grey or brown, rough with longitudinal cracks and exfoliating in long irregular plates. *Branches* occasionally spinescent when young; young shoots and underside of leaves usually pubescent or tomentose. *L.*—7.5-15 × 9 cm., elliptic-oblong or elliptic-ovate, obtusely pointed, retuse or emarginate at the apex, rounded or slightly cordate at the base, entire or slightly crenulated, coriaceous, glabrous above, glaucous or more or less hairy beneath. *Fl.*—greenish-yellow, monœcious on very short pubescent pedicels, numerous, in solitary axillary clusters, or forming spikes in the axils of the leaves, and often panicle at the end of the branchlets. Petals of male flowers on long claws; disc. 5-lobed. *Fr.*—a berry, globular, size of a pea, succulent, black when ripe. *Fl. t.*—May-Oct. *Fr. t.*—Oct.-Jan. Sheds leaves Mar.-Apr.; new foliage May-June.

DISTR. :—Throughout the hotter parts of India in deciduous monsoon forests; tolerably common in the Konkan and the Deccan hills; along the base of the Himalyas from Kashmir to Mishmi, and southwards to Ceylon.

DESCR. OF WOOD :—*Colour* grey to olive-brown. Close-grained. *An. rings* marked by pale lines. *Pores* moderate sized, in short radial groups, or single, scanty, the groups sometimes obliquely or almost concentrically arranged. *Med. rays* numerous, uniform and equidistant, moderately broad, visible on radial section as a silver-grain; the distance between two rays equal to, or less than the transverse diameter of the pores. Moderately hard to hard; seasons well; durable, stands well under water; saws and machines easily and can be worked without difficulty to a smooth finish. *Wt.*—52 lbs. per c.ft.

USES :—Wood used for buildings, floor boards, and other domestic purposes, cart-shafts, yokes and agricultural implements. Root and bark are used medicinally. Bark is used for tanning; fruit is eaten and leaves cut to feed cattle.

See—Medicinal Plants, Dyes and Tans, Fruit Trees, Fodder Plants.

BRUGUIERA GYMNO RHIZA Lamk.

FAM.—Rhizophoraceæ.

COM. NS. :—No common names.

CHAR. :—A glabrous evergreen tree, 9-12 m. high, girth 1.5-2.4 m. Bark rough, dark with large corky lenticular patches. *L.*—shortly oblong-elliptic, or oblong-lanceolate, 7.5-15 × 4.6-5 cm., coriaceous, on a thick petiole 2.5 cm. long. *Fl.*—red, about 2.5 cm. diam., on short, thick drooping peduncles, shorter than the petioles; solitary in the axils of the leaves. Calyx tube almost campanulate; limb 10-14-cleft; the segments 6-8-lin., stiff. Corolla petals 10-14, densely hairy at the base, 2-lobed, with 2-4 bristles on each lobe and one in the sinus between the lobes. *Fr.*—oblong, drooping, crowned at first with the stiff calyx lobes; germinating radicle cylindric, smoothish. *Fl. t.*—Dec.-Mar.

DISTR. :—Common along sea-coasts, creeks, tidal rivers and salt-marshes. Coasts of the Peninsula, Sundribans; Indian archipelago, Sind, Burma, N. Australia.

DESCR. OF WOOD :—*Colour* red. Coarse-grained. *Pores* small, oval and sub-divided. *Med. rays* moderately broad, fine, very numerous. Extremely hard, heavy, strong, durable, difficult to split. *Wt.*—54 lbs. per c.ft. (one specimen).

USES :—Wood is used for house-building (posts, beams, frames etc.), furniture; also used as firewood. Bark contains large quantity of tannin and constitutes an article of commerce.

See—Dyes and Tans.

BUCHANANIA LANZAN Spreng.

FAM.—Anacardiaceæ.

COM. NS. :—*G.* Charoli; *H.* Char, Paira, Piyal; *K.* Charpoppu, Kolegaru, Murukali; *M.* Char, Charoli, Pyalchar.

CHAR. :—A moderate-sized deciduous tree; trunk straight, 12-14 m. high, girth 1.2 m. Bark 2.5 cm. thick, dark-grey, sometimes

nearly black, rough, tessellated with regular "boss"-like prominences. *L.*—15.25 × 6.3-12.5 cm., rounded or obtuse at the tip, coriaceous, firm, entire, 15-20 pairs of prominent nerves, villous or pubescent, glabrate beneath, on a flattened, stout, pubescent petiole. *Fl.*—numerous, greenish-white, small, sessile or on very short pedicels, forming terminal and axillary, woolly or velvety, much-branched panicles. Calyx small, 5-toothed. Corolla petals oblong. Disc fleshy, 10-lobed. Stamens 10. Ovary only 1 fertile, conical, hairy; the remaining 4 reduced, to staminodes. *Fr.*—drupe, compressed, smooth, sub-globose, black when ripe, 1.3 cm. long. Nut hard, bony, 2-valved. *Fl. t.*—Jan.-Mar. *Fr. t.*—Apr.-May. Sheds leaves in hot season.

DISTR. :—In dry and open forests throughout India, Konkan, Deccan, Dangs; Gujarat, S. M. Country, Burma, Cambodia, Indo-China, Siam.

DESCR. OF WOOD :—*Colour* greyish-brown, with a small, dark-coloured heart-wood. *Pores* large, round or oval, scanty, frequently sub-divided, prominent on a vertical section. *Med. rays* very numerous, fine, reddish, uniform and equidistant, bent outwards where they touch the pores, and giving a silver-grain of narrow dark-coloured plates. Straight-grained with coarse texture and rough feel. Moderately hard and strong; prone to rapid fungus attack when green, hence requires quick drying; seasons well without degrade and presents no difficulty; not very durable; easy to saw and work to a moderate finish. *Wt.*—29 lbs. per c.ft. (air-dry).

USES :—Wood not used to any large extent; small beams and rafters, door and window frames, cheap furniture, cattle yokes and mining timber in collieries. Good for match-boxes and charcoal. Bark used for tanning; it exudes a transparent gum. Fruits are eaten. Kernels employed in Indian confectionery.

N.B.—As it is a species which is often found in considerable quantities in some localities and one for which an extended market is wanted, it would be worth while investigating its possibilities after preservation treatment. This tree is very useful for clothing dry hills.

See—Dyes and Tans, Gums and Resins, Fruit Trees.

BUTEA MONOSPERMA O. Kuntz.

(BUTEA FRONDOSA Roxb.)

FAM.—Papilionaceæ.

COM. NS. :—*E.* Bastard Teak, Bengal Kino Tree, Flame of the Forest; *G.* Khakda, Khakaro; *H.* Chinchra, Dhak, Kakria; *K.* Muttala, Kuttugga; *M.* Palas, Paras.

CHAR. :—A moderate-sized deciduous tree; 12-15 m. high, girth 1.8-3 m. *Bark* fibrous, grey, exfoliating in small irregular pieces; exuding from cuts and fissure a red juice, which hardens into gum. Young parts covered with grey or brown silky pubescence. *L.*—pinnately-trifoliate, in petiole 7.5-15 cm. long. Leaflets 10-15 × 7.5-11.7 cm., coriaceous, hard, glabrescent above, hoary beneath; two lateral ones oblique-ovate; the terminal one roundish, obtuse,

often emarginate at the apex, rhomboid at the base, larger, as long as broad in the middle. *Fl.*—large, bright orange-red, on thickly brown pubescent pedicels, arranged in tomentose, terminal and axillary racemes 15 cm. long. Calyx 1·3 cm., silky inside. Corolla—petals equal, densely clothed on external side with silky pubescence; standard broad; keel-acute, incurved. *Fr.*—legume, pendulous, tomentose, 6·8 × 4·5·5. Seed oval, flat, brown. *Fl. t.*—Feb.-Mar. *Fr. t.*—June-July. Sheds leaves in cold season; new leaves in Apr.

DISTR. :—Throughout the State, common in deciduous forests of Konkan, Deccan, Khandesh; throughout India from the Himalayas to Ceylon and Burma, usually in open grassy savannahs where it is often gregarious.

DESCR. OF WOOD :—*Colour* grey or grey-brown, white or brown if cut up fresh. No *an. rings*. Open-grained. *Pores* large, often sub-divided, extremely scanty. *Med. rays* broad and moderately broad, pale; the darker tissue between the rays is broken up into oblong patches by broad concentric bands of pale tissue similar in appearance to the med. rays, alternating with dark patches, both distinctly visible on a radial section as long, irregular, alternate dark and light bands. Soft, light, spongy, not durable above ground but durable under water. *Wt.*—38 lbs. per c.ft.

USES :—Wood used for rough packing, well-curbs, scoops and toys. Yields a gum (Bengal Kino) which is used as a dye and tan. Fibre from the inner bark is strong and used for rough cordage and for caulking boats. Leaves are used as plates, for crude umbrellas and cattle fodder. Seeds used medicinally. Used for rearing lac insect. Wood used for gunpowder charcoal (Beddome).

N.B.—Silviculturally the tree is of importance as being one of the commonest trees of the plains of India and as being capable of thriving on saline soils and badly drained grounds where most species will not grow.

See—Medicinal Plants, Gums and Resins, Dyes and Tans, Fibres, Fodder Plants.

CAESALPINIA CORIARIA Willd.

FAM.—Cæsalpinaceæ.

COM. NS. :—*E.* American Sumach; *K.* Divi-Divi, Vilayati-Yaldckayi; *M.* Divi-Divi.

CHAR. :—A small spreading tree. Stem without prickles. *Bark* dark reddish-brown, thin, finely fissured vertically. *L.*—with 6·8 pairs of pinnæ. Pinnæ with many small leaflets, 25·30 pairs approaching those of an acacia in general appearance. *Fl.*—small, light yellow or green, in short dense panicles. *Fr.*—pod, 5·7·5 × 2 cm., ·3 cm. thick, twisted, fleshy, smooth, pale to blackish-brown in colour. Flowering and fruiting occurs twice a year—Jan.-Feb. and June-July.

DISTR. :—Cultivated in Dharwar, Belgaum and Kanara in the Bombay State; planted on the road-sides. Native of South America and West Indies; introduced into India and now almost acclimatized in S. India.

DESCR. OF WOOD :—*Colour*—sap-wood greyish-white, heart-wood nearly black. Close-grained. *Pores* small, scanty, enclosed in pale tissue which spreads into concentric, interrupted, often anastomosing narrow bands. *Med. rays* fine, white, narrow, regular and conspicuous. *An. rings* distinct. Hard, heavy. *Wt.*—56 lbs. per c.ft.

USES :—Not used, but is likely to be useful for various purposes, Pods used for tanning leather and make good ink. Pod-powder used medicinally.

N.B.—It should be a useful tree to plant on poor soils. Its growth is fairly fast (Gamble).

See—Dyes and Tans.

CAESALPINIA SAPPAN Linn.

FAM.—Cæsalpinaceæ.

COM. NS. :—*E.* Sappan-wood tree; *G.* Bakam; *H.* Bakam, Patanga; *M.* Patang.

CHAR. :—A small tree, 6-9 m. high; stem prickly, 15-23 cm. in diameter, branches rufous hairy, armed with a few small prickles. *L.*—20-37 cm. long, pinnæ 8-12 pairs, 10-15 cm. long, subsessile, with small prickles at the base. Leaflets 10-18 pairs, subsessile, oblong, rounded at the apex, attached at the lowest corner, very inequilateral (upper side much the largest), glabrous above, hairy beneath. *Fl.*—in panicles which are terminal and in the axils of upper leaves, 30-40 cm. long. Calyx leathery. Corolla 2 cm. across. Petals orbicular, yellow, subequal, upper with a red spot at the base. Stamens waxy white; filaments densely woolly at the base. *Fr.*—pod, 7.5-10 × 4.5 cm. woody, obliquely oblong, polished, indehiscent, with a hard recurved short beak at the upper angle of the obtuse apex. Seeds 3-4. *Fl. t.*—Sept.-Oct.

DISTR. :—Often planted in gardens in Bombay and the Deccan, South India, Bengal, Burma.

DESCR. OF WOOD :—*Colour*—sap-wood white; heart-wood orange-yellow. *Pores* isolated, small, in narrow pale rings, scanty between the fine, wavy, numerous *med. rays*. Hard, takes a fine polish; very pretty. *Wt.*—60 lbs. per c.ft.

USES :—Wood valuable for small work such as inlaying. Wood and pods yield a valuable red dye used for colouring silk.

See—Dyes and Tans.

CALAMUS PSEUDOTENUIS Becc.

FAM.—Palmeæ.

COM. NS. :—*E.* Cane; *G.* Natar; *H.* Bet; *M.* Vet.

CHAR. :—Extensive climber; stems slender. Sheaths set with many unequal straight, flat, very sharp spines reaching sometimes 2.5 cm. long. *L.*—about 1.2 m. long; petioles with a few solitary short spreading spines; rachis not produced into a flagellum, armed. Flagellum of sheath very long, compressed below, thin, cylindric,

set with half rings of hooked spines; leaflets 50 or more, nearly equidistant, $20\cdot37\cdot5 \times 1\cdot8\cdot2\cdot5$ cm., linear lanceolate, acuminate, thin, with setulose margins; nerves 3-5. *Male fl.*—spikes of the spadix long, flowers usually 2-3 together, sub-globose; calyx cupular, lobes acute; petals short, sessile, polished. *Female fl.*—spadix very long, slender; branches distant armed with deflexed spines. Spathes flattened. *Fr.*—ovoid, 1·3 cm. in diam.; back stout, conical. *Fl. t.*—different times throughout the year.

DISTR. :—Fairly common in the N. Kanara ghats in the rain-forests; Western Peninsula; Ceylon.

USES :—The stem furnishes the thin canes extensively used throughout the State for baskets, cane-work, mats, and many other purposes.

CALAMUS THWAITESII Becc.

FAM.—Palmeæ.

COM. NS. :—*E.* Cane; *K.* Handibet.

CHAR. :—A large climber; stem stout, erect up to or more than 30 m., 3·8 cm. in diam., leaf-sheaths with close raised lines, set with stiff sharp spines 2·5-5 cm. long, with smaller ones below each line of large ones. *L.*—about 1·4 m. long, petiole channelled above, set with rings of spines; rachis not produced into flagellum; leaflets many, $6\cdot75$ m. \times 3·8-2·5 cm., equidistant, very acute, with ciliate and spiny margins; 3-nerved beneath. *Male fl.*—spadix up to 6 m. long, very slender, flagellum long set with whorls of hooked spines. Calyx 3-lobed, rounded. Petals ovate-oblong. *Female fl.*—spadix with stouter branches than the male. Perianth enlarged in fruit. *Fr.*—seated on the perianth, about 2·5 cm., long, beaked; ellipsoid. *Fl. t.*—Feb.-Mar.

DISTR. :—Common in the evergreen forests at the foot of the Nilkund ghat of N. Kanara, forming extensive cane brakes in the Yellapur and Supa talukas: Sea-coast near Marmagoa, growing in laterite; Western Peninsula: Ceylon.

USES :—Canes used for walking sticks, baskets, mats, furniture, and many other purposes.

CALOPHYLLUM INOPHYLLUM Linn.

FAM.—Guttiferæ.

COM. NS. :—*E.* Alexandrian Laurel; *G.* Udi; *H.* Sultana-champi; *K.* Wuma, Hona, Pinekai; *M.* Undi; *Tr.* Poon.

CHAR. :—A beautiful evergreen tree; stem short with a thick cylindrical trunk; 15-18 m. high with a girth of about 1·8-4·2 m. *Bark* dark coloured, scaly, fissured. *L.*— $10\cdot4\cdot20\cdot8 \times 7\cdot8\cdot8\cdot13$ cm., elliptic or obovate-oblong, obtuse or retuse at the apex, usually acute at the base, firmly coriaceous, glabrous, shining; on a rather strong petiole. *Fl.*—about 2·6 cm. in diam., pure white, fragrant, arranged in axillary, glabrous, lax, few-flowered racemes, the length of the leaves or somewhat shorter. Calyx—sepals 4, the two inner petaloid. *Corolla*—petals 4, rarely 6-8. Stamens numerous, in 4 bundles.

Ovary round, stipitate; style much longer than the stamens; stigma peltate. *Fr.*—an indehiscent drupe, 2.6 cm. diam., globular, yellow when ripe, pulpy. *Fl. t.*—cold season. *Fr. t.*—hot season.

DISTR. :—Very common in Malabar and the sandy shores of the S. Konkan and N. Kanara associated with littoral species. Indigenous throughout the W. Peninsula, Orissa, Burma, Ceylon and the Andamans, particularly near the sea-coast, also cultivated as an ornamental tree.

DESCR. OF WOOD :—*Colour* reddish-brown. *Pores* moderate-sized, arranged in groups or oblique strings. *Med. rays* extremely fine and numerous, bent round the pores. Occasional interrupted concentric lines of darker, but softer, tissue prominent on all sections. Excellent, hard, strong, constructional timber, offers no difficulty as regards seasoning, moderately durable, easy to saw and work. *Wt.*—42 lbs. per c.ft.

USES :—Wood valuable for ship-building, masts, spars, railway sleepers and machinery. Magnificent wood for cabinet making; also for house building. It is worthy of the notice of engineers and architects. Oil from the seeds used in medicine, for burning and for painting wood-work.

See—Oils, Medicinal Plants.

CALOPHYLLUM TOMENTOSUM Wight.

FAM.—Guttiferæ.

COM. NS. :—*E.* Poon Spar tree, Sirpoon tree; *K.* Surhonne, Ponne, Kve; *M.* Nagari; *Tr.* Poon.

CHAR. :—A large tall evergreen tree. Trees 45 m. high with a girth of 4.5 m. are common. *Bark* yellowish with long, wavy, vertical fissures, branches 4-gonous, young shoots and panicles rusty-tomentose. *L.*—7.8-13 × 3.2-5.2 cm., elliptic or linear-lanceolate, with a bluntish acumination, rigidly coriaceous, shining, glabrous. *Fl.*—white, about 1.34 cm. diam., on slender pedicles, or racemes from the axils of upper leaves, sometimes arranged into a large terminal, many-flowered panicle. *Calyx*—sepals 4, subrotund. *Corolla*—petals 4, ovate. *Ovary* 1-celled, 1-ovuled; stigma peltate. *Fr.*—drupe, ovoid, pointed, about 2.5 cm. long. *Fl. t.*—Jan.-Feb. *Fr. t.*—end of rainy season.

DISTR. :—Evergreen forests of the Western Peninsula from the Konkan southwards, ascending to 1500 m.; Ceylon.

DESCR. OF WOOD :—*Colour* reddish brown; streaked on the vertical sections by the dark concentric lines and the pores. *Pores* large, scanty, in oblique strings. *Med. rays* fine, very numerous, bent round the pores. Concentric lines, long or short, interrupted, dark. Moderately hard; takes a good polish without absorbing much polish. *Wt.*—36 lbs. per c.ft.

USES :—House building, bridge construction, masts, spars, cooper's work (vats, casks, etc.), and occasionally used for railway carriage furniture. Seeds afford an abundant oil in Ceylon, used for burning in lamps.

See—Oils.

CALOPHYLLUM WIGHTIANUM Wall.

FAM.—Guttiferæ.

COM. NS.:—*E. Poon Spar of Travancore*; *K. Irai, Kiri honne, Kulponne*; *M. Bobbi*; *Tr. Poon*.

CHAR.:—A middle-sized evergreen tree, branches terete, young shoots square, glabrous. *Bark* very thick and characteristic, yellow. *L.*—5.2-10.4 × 3.2-5.2 cm., cuneate-obovate or oblong-cuneate, obtuse or retuse at the apex, very rigidly coriaceous, shining, on petiole 1/6 in. *Fl.*—white, 67 cm. diam., on slender pedicels, with a caducous bract at their insertion, arranged in axillary, many-flowered racemes, shorter than the leaves. *Calyx*—sepals 4, thin, strongly veined. *Corolla*—petals usually none. *Ovary* 1-celled. *Fr.*—2 cm., oblong. *Fl. t.*—Dec. *Fr. t.*—Mar.

DISTR.:—Moist forests of the Western Peninsula from the Konkan southwards. Common along the banks of North Kanara rivers; Ceylon.

This tree is everywhere becoming scarce and calls for strict conservation (Birdwood and Beddome).

DESCR. OF WOOD:—*Colour* red. *Pores* large and moderate-sized, uniformly distributed. *Med. rays* very fine, not very distinct, numerous, interrupted, wavy and anastomosing concentric bands of soft tissue. Hard, strong and ranging on an average a little below teak in strength, but harder than teak. Seasons well and has a reputation of being slightly more refractory than the other poons, with a tendency to surface cracking. Moderately durable; easy to saw and work. *Wt.*—45 lbs. per c.ft.

USES:—Wood used for house-building and bridge-construction; much esteemed for engineering purposes.

CANARIUM STRICTUM Roxb.

FAM.—Burseraceæ.

COM. NS.:—*E. Black Dammar Tree*; *K. Raldhup*; *M. Gugul*.

CHAR.:—A very large deciduous straight tree. *Bark* grey, roughish; young branches, petioles and panicles clothed with dense rusty-tomentum. *L.*—3-1.2 m., equally or unequally pinnate. *Leaflets* 7-15; 7.8-31.2 × 5.2-13 cm., opposite or subopposite, ovate-oblong, or ovate-lanceolate, acuminate, petioled, more or less crenulate, glabrescent and shining above, more or less tomentose beneath. *Fl.*—white, numerous, in axillary panicles. *Calyx*—campanulate, tomentose, 3-4-fid, valvate, persistent. *Corolla*—petals 3-4, much imbricate, thinly hairy at the apex. *Male flower*—disc none. *Stamens* 6, filaments united below into a tube. *Anthers* oblong, dorsifixed, dehiscing longitudinally. *Ovary* small, 6-lobed, densely hairy-tomentose at the apex. *Female flower*—ovary glabrous, as long as the stout style. *Fr.*—drupe, oval, 4.5-2 cm., tapering at both ends, with a hard, bony, 3-celled nut. *Fl. t.*—hot season. *Fr. t.*—cold season (Jan.). This handsome tree is one of the most conspicuous trees in the forests, especially when in new leaf, for the young leaves are of a bright crimson colour, very hairy and like red velvet.

DISTR. :—In evergreen forests from the Konkan hills southwards in W. Peninsula. Common on some of the N. Kanara ghats; various parts of Madras State; alt. 1,500 m.

DESCR. OF WOOD :—*Colour*—sap-wood greyish-white, heart-wood pink. *Pores* moderate-sized, scanty, often sub-divided. *Med. rays* fine, numerous; shining on cross section, smooth. Heaviest and hardest of the dhups. Moderately strong, very prone to discoloration from fungus attack, readily attacked by boring insects, non-refractory from the seasoning point, not very durable, easy to saw and work, takes good finish. *Wt.*—41 lbs. per c.ft.

USES :—Wood used for packing cases; tree is the source of a dark resinous substance known as "Black Dammar" of commerce, used in manufacturing bottling wax, varnishes, etc.

See—Gums and Resins.

CANTHIUM DICOCCUM Merr.

(PLECTRONIA WIGHTII T. Cooke.)

FAM.—Rubiaceæ.

COM. NS. :—K. Hanigigari, Hunnagere, Yellal; M. Arsul, Tupa.

CHAR. :—An unarmed handsome large erect shrub or small tree; branchlets 4-angled, 9-15 m. high. *Bark* dark-grey, smooth. *L.*—5-15 × 5-10 cm., oval, elliptic-obtuse or obtusely acuminate. Dark-green, coriaceous; nerve-axils glandular; stipules triangular. *Fl.*—white, fragrant, in axillary umbels on short, very stout, compressed peduncles. Corolla segments 5, tube hairy inside. *Fr.*—oblong, compressed, almost didymous, on slender pedicels. *Fl. t.*—Nov.-Jan. *Fr. t.*—Apr.-June.

DISTR. :—Common in the evergreen forests of the Konkan and N. Kanara, Sikkim Himalaya, Western Peninsula from the Konkan southwards, Ceylon.

DESCR. OF WOOD :—*Colour* grey or reddish-grey. Close-grained. *An. rings* very distinct. *Pores* very small, numerous. *Med. rays* fine and very fine, numerous. Hard. *Wt.*—42 lbs. per c.ft.

USES :—Wood used for agricultural implements and for making combs in N. Kanara; a possible substitute for boxwood for engraving.

CAPPARIS DECIDUA Pax.

(CAPPARIS APHYLLA Roth.)

FAM.—Capparidaceæ.

COM. NS. :—H. Kari; G. Ker; K. Shipri-gida; M. Kera, Nepati.

CHAR. :—A straggling much branched shrub or a small tree about 6 m. high with a girth of 1.2-1.5 m. (rare). Thorns twin, nearly straight brown. *Bark* 1.34 cm. thick, grey, corky, with deep irregular cracks. *L.*—4.1-3 cm. long only on young shoots, caducous, sessile, linear-subulate, pungent. *Fl.*—2.6 cm. diam., red-brown or scarlet, in many-flowered corymbs, on very short lateral shoots.

Calyx sepals unequal, the inner sepal larger and saccate, sub-valvate. Corolla petals ovate, longer than sepals. Stamens 8-20, filaments long-filiform. Ovary on a gynophore. Style subulate. *Fr.*—fleshy, ovoid or globose, red, size of a cherry, long-beaked. *Fl. t.*—hot season. *Fr. t.*—Nov.-Mar.

DISTR. :—Common in Cutch, Gujarat and the Deccan (along the banks of the Deccan rivers mixed with *Acacia arabica* and *Zizyphus jujuba*) as far south as Tirunelveli. Arid and dry regions of the Punjab, Rajasthan, and Deccan Peninsula, Sind and Baluchistan.

DESCR. OF WOOD :—*Colour* light yellow when fresh turning brown on exposure, shining. Close-grained. *Pores* small, often sub-divided, generally in radial lines at intervals between the prominent, very short, numerous, wavy, fine. *Med. rays* often filled with resin. Very hard; it is bitter and not attacked by white ants. *Wt.*—53 lbs. per c.ft.

USES :—Wood used for small beams and rafters in roofs, knees of boats, oil-mills, agricultural implements, combs, bowls, spoons and other utensils. Used as a fuel which burns with a strong flame; it answers for brick-burning. The unripe and ripe fruits and flower-buds are used as pickle. Young shoots and leaves are used as blister.

See—Food Plants.

CAPPARIS GRANDIS Linn.

FAM.—Capparidaceæ.

COM. NS. :—K. Torate; M. Kauntal, Katarni, Pachoonada.

CHAR. :—A small tree, generally unarmed sometimes armed with slightly curved thorns; trunk thick, thorns short; about 4.5 m. high. Branchlets and leaves softly yellowish, tomentose. *Bark* thick, extremely irregular, rough and corky, deeply and irregularly cracked. *L.*—5.2-7.8 × 1.3-5 cm., ovate or obovate, acute at both ends, or rarely obtuse, glabrous on both surfaces when old. *Fl.*—2.2-6 diam., white, in terminal corymbs or racemes; pedicels slender. Calyx sepals tawny, puberulous, unequal. Corolla petals narrow-obovate, unequal. Stamens numerous. Gynophore slender. *Fr.*—size of nutmeg, globose, purple, 2-6 seeded. *Fl. t.*—May. Sheds its leaves in the hot season.

DISTR. :—Hilly parts of the Carnatic, Deccan and Ceylon; Dharwar district; Chanda district; Eastern ghats; dry regions of Ceylon; Prome district in Burma. Fairly common in the dry open forests on the Katraj ghat and Chatursingi hills near Poona.

DESCR. OF WOOD :—*Colour* white or greyish white. *An. rings* sometimes marked by a broken line of pores. *Pores* scanty, small, moderate-sized or large, arranged irregularly and at intervals between the rays. *Med. rays* moderately broad, short. Wood moderately hard and durable. *Wt.*—46 lbs. per c.ft.

USES :—Wood much used for ploughshares and rafters.

CARALLIA BRACHIATA Merr.**(CARALLIA INTEGERRIMA DC.)****FAM.—Rhizophoraceæ.**

COM. NS. :—K. Andamargal, Andipunnar, Makad-bhirand ;
M. Pansi, Punshi, Shengali.

CHAR. :—A moderate-sized glabrous evergreen tree, 7·5-15 m. high ; girth 1·2-3 m. *Bark* dark-grey, thin. *L.*—dark-green, lucid, quite entire, or rarely serrulate towards the apex, elliptic-ovate, obovate, narrow, oblong, obtuse, acute or short acuminate, narrow or acute at the base, glabrous, coriaceous. *Fl.*—white, very small, usually 8-merous, in dense, almost capitate, short-peduncled, axillary cymes. Calyx broad-campanulate. Corolla petals deeply laciniate, obovate concave, not embracing the stamens. *Fr.*—berry, size of a pes, globose, 1-seeded. *Fl. t.*—Feb.-Mar. *Fr. t.*—Apr.-June.

DISTR. :—Throughout the evergreen forests of the Konkan and N. Kanara, Matheran, Khandala, S. M. Country. Forests of the outer Sikkim Himalayas, Bengal, Assam, Burma, Ceylon, Malaya, China, Australia.

DESCR. OF WOOD :—*Colour* red. *Close-grained.* *Pores* moderate-sized or large, sometimes very large, often sub-divided, often septate, often filled with resin. *Med. rays* both very broad and fine, numerous fine between each pair of broad rays. Many irregular fine transverse bars joining or partly joining the broad med. rays. Hard, heavy ; seasons well without warping, works well. The wood is very handsome and polishes well. *Wt.*—46 lbs. per c.ft.

USES :—Wood used for house-building (chiefly planking), ornamental panelling, parquet-flooring, furniture and cabinet-making ; specially suitable for brush-backs.

CAREYA ARBOREA Roxb.**FAM.—Lecythidaceæ.**

COM. NS. :—E. Wild Guava ; **G.** Kumbi ; **H.** Kumbhi, Vakambi ;
K. Daddala, Gavahannu, Hennumatti ; **M.** Kumbha.

CHAR. :—A glabrous middle-sized or sometimes a large deciduous tree, 9-18 m. high ; girth 1·5-2·4 m. *Bark* thick, rough, dark-grey ; inner bark red, fibrous. Wholly glabrous. *L.*—15-30 × 10-15 cm., oblong, obovate or orbicular, membranous, sessile or very short-petioled, crenate, denticulate, obtuse or shortly acute. *Fl.*—5·6·5 cm. diam., white with purple filaments, subtended by 3 unequal bracts arranged in short spikes, with an unpleasant smell. Calyx campanulate. *Fr.*—6·5 × 5 cm., globose, and crowned with the persistent calyx-tube. *Fl. t.*—Mar.-Apr. *Fr. t.*—May-July. Sheds leaves during early part of hot season and is soon covered with new leaves (Mar.-Apr.). Leaves turn red in cold season.

DISTR. :—Very common throughout India and the State in monsoon forests; also in valleys and ravines throughout the drier areas. Common in S. Konkan and Western Ghats; Ceylon, Malayan Peninsula, Siam.

DESCR. OF WOOD :—*Colour*—sap-wood whitish, large; heart-wood dull-red, sometimes claret coloured, very dark in old trees. Even-grained. *Pores* oval, moderate-sized to large, sub-divided, wavy on vertical section. *Med. rays* numerous, fine, equidistant and uniform; the space between two connective rays less than the diameter of the pores, round which they bend. Across the *med. rays* are numerous very fine transverse bars. Moderately hard, strong, durable, easily seasoned, takes fine polish, stands well under water. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for cart-building, cabinet-work, furniture and agricultural implements. Bark-fibre gives a strong cordage. Fuses made from the bark are used to make slow-matches. Root, bark, leaves and fruits are used medicinally. Fruits are used as fodder by cattle.

See—Medicinal Plants, Fibres, Fodder Plants.

CARYOTA URENS Linn.

FAM.—Palmæ.

COM. NS. :—E. Wild Sago-palm, Hill-palm; G. Sankar- Shiva-jata; K. Bagni, Bainsi, Bhyni, Bugani; M. Berli, Bherli-mad.

CHAR. :—A very handsome palm, 9-18 m. high; girth .6-.9 m. Stem cylindric, annulate, smooth, shining grey. *L.*—5.4-6 × 3.6 m., bipinnate, on stout, sheathing petioles, pinnae numerous; leaflets cuneate, triangular, præmorse. Spathes several. *Fl.*—monœcious in long, pendulous, branched spadices. Calyx and corolla 3-parted, valvate. Male flowers yellow; stamens numerous, rudiment of ovary none. Female flowers greenish or purplish, smaller than male, staminodes 3, ovary 1-celled. *Fr.*—roundish or nearly so, size of a nutmeg, brownish, stinging (hence the name *urens*). *Fl. t.* and *Fr. t.*—throughout the year.

DISTR. :—Common in evergreen forests throughout the hotter parts of India, the Konkan and N. Kanara, Mahabaleshwar, Khandala. In the lower Himalayas, from Nepal eastwards ascending to 1500 m. in Assam, Khasia hills, Manipur, Chittagong, shady valleys of the Eastern and Western Ghats in evergreen forests. Low country of Ceylon. Much planted in gardens.

DESCR. OF WOOD :—Very hard in outside portion, soft within, the outside brown with close black streaks caused by the horny part of the fibro-vascular bundles. This is black, somewhat quadrangular or triangular in section, with a large pore at the base inside. Hard, strong, durable. *Wt.*—55 lbs. per c.ft.

USES :—Wood is used for plough shafts and other agricultural implements, water conduits and buckets; also employed for rafters in house-building. The leaves give the "Kitul" fibre. The interior of the stem is filled with a sago-like starch which is made into bread and boiled into gruel. Seemann says it is good and very nutritious. This forms a great part of the diet of the people, where this tree

grows in abundance, especially in famine days. From the cut spadix large quantity of toddy is obtained. Leaves are the chief fodder for elephants in those regions.

See—Fibres, Food Plants, Liquors, Fodder Plants.

CASEARIA GLOMERATA Roxb.

FAM.—Flacourtiaceæ.

COM. NS. :—*H.* Chilla, Kathera, Naro ; *K.* Konje ; *M.* Bohkra.

CHAR. :—A glabrous evergreen tall shrub or a small tree, about 6 m. high ; girth 30-33 cm. young branches obtusely angular. *Bark* dark-grey with a few longitudinal wrinkles. *L.*—7·5-20 × 2·5-5 cm., broad-elliptic, short-acuminate, or obtuse, crenate-dentate, narrow and rounded at the base. *Fl.*—numerous, green, with a disagreeable odour, clustered in the axils of the leaves ; pedicels short, articulated above the base, pubescent below the articulation. Calyx lobes 5, sometimes pubescent. Corolla petals none. Stamens 8, alternating with scale-like staminodes. *Fr.*—fleshy, 2 cm., oblong ellipsoid, 3-valved. *Fl. t.*—Aug.-Jan.

DISTR. :—In open situations on the ghats, S. Konkan, Mahabaleshwar, Matheran, Mawal ; sub-Himalayan tract from the Chenab eastwards, Oudh, Madhya Bharat : Burma.

DESCR. OF WOOD :—*Colour* yellowish-white. Close-grained. *Pores* small in radial lines. *Med. rays* in two sizes ; numerous very fine rays between fewer moderately broad ones giving a silver-grain on a radial section, the distance between them equal to the diameter of the pores. Rough, moderately hard. *Wt.*—46 lbs. per c ft.

USES :—Wood used for building, charcoal and occasionally for tea-boxes.

CASEARIA TOMENTOSA Roxb.

FAM.—Flacourtiaceæ.

COM. NS. :—*H.* Bhari, Chilara, Chilla ; *K.* Konje ; *M.* Karsi, Lainja, Modi, Modgi.

CHAR. :—A small tree, about 9 m. high ; girth 1·2-2 m. *Bark* thick, ash-coloured, bitter. Branchlets tomentose or nearly glabrous. *L.*—10 × 4 cm., tomentose, pubescent, or scantily hairy at the base of the midrib, ovate, elliptic-oblong or lanceolate, serrulate, or nearly entire, somewhat unequal and rounded at the base. *Fl.*—small, numerous, greenish-yellow, in dense axillary fascicles. Stamens 7-10. Staminodes hairy, alternating with the calyx lobes. *Fr.*—fleshy, ovoid, 2 cm., 3-valved. Seeds embedded in a red soft arillus. *Fl. t.*—Jan.-May. Sheds leaves Jan.-Mar. ; new leaves Mar.-Apr.

DISTR. :—Throughout India and the State in deciduous forests, tolerably common. Konkan, Deccan hills, S. M. Country (Belgaum hills) : Ceylon, Malaya, N. Australia.

DESCR. OF WOOD :—*Colour* yellowish-white. Close-grained. *Pores* small and very small, in radial lines. *Med. rays* fine and very

fine, wavy, equidistant, very numerous, bent round the pores. Moderately hard, rough, soft. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for combs and small wood-work. Temporary huts. The milky juice of the fruit is used for poisoning fish. Pounded bark used for adulterating Kamala powder.

See—Fish Poisons.

CASSIA FISTULA Linn.

FAM.—Cæsalpinaceæ.

COM. NS. :—*E.* Golden Shower, Indian Laburnum, Pudding Pipe or Stick; *G.* Bala, Garmala; *H.* Amaltas, Bandartauri; *K.* Aragina, Kakka, Konde; *M.* Bahava.

CHAR. :—A moderate sized deciduous tree, 9-15 m. high, girth 9-1.8 m. *Bark* greenish-grey, compact, smooth when young, reddish brown and rough in old trees exfoliating in many-sided patches. *L.*—pinnate, 30-45 cm. long; leaflets 4-8 pairs, ovate or ovate-oblong, 5-13 cm. long, on petioles 2-3 lin. long, acuminate, thin. *Fl.*—large, showy, yellow, on slender pedicels, 4-5 cm. long, arranged in drooping racemes, 3-6 m. long, from the axils of the new leaves or from above the scars of fallen ones. Calyx of 5 nearly equal, velvety, deciduous lobes. Corolla petals obovate-oblong, nearly equal, about 2.5 cm. long. Stamens unequal, the 3 lowest longest, incurved, 1-3 very short. *Fr.*—pod, cylindrical, pendulous, 6-9 m. long, dark-brown, smooth, indehiscent, divided into numerous one-seeded chambers by thin transverse partitions. Seeds ovoid, somewhat compressed, brownish, enveloped in a soft black pulp. *Fl. t.*—Mar-May. *Fr. t.*—cold season.

DISTR. :—Throughout mixed monsoon forests in the Deccan, Konkan and Khandesh Akrani. Planted as ornamental and roadside tree throughout India, Ceylon, Malaya.

DESCR. OF WOOD :—*Colour*—sap-wood white; heart-wood varying in colour from grey or yellowish-red to brick-red, darkens much on exposure. *Pores* moderate sized to large, often sub-divided, often filled with resin, scanty, uniformly distributed, enclosed in and joined by white wavy irregular, often interrupted, often anastomosing, concentric bands of soft tissue. *Med. rays* very fine numerous, uniform and slightly bent, prominent in the dark firm tissue, which separates the wavy bands. Very hard, durable, difficult to work, usually of small dimension, somewhat brittle and liable to splinter; takes a good polish without absorbing much polish. *Wt.*—61 lbs. per c.ft.

USES :—Wood used for house-building (chiefly beams, posts and scantlings), bridge-posts, carts and their parts, agricultural implements, rice-pounders, boat-building, bowls, tool-handles, turning. It is recommended for bed-plates for machinery by Graham Anderson; it is an excellent fuel, and gives good charcoal of bright colour and good ring. Pod pulp eaten by bears and monkeys; used medicinally as a purgative; also used to flavour tobacco. Bark used for tanning.

See—Medicinal Plants, Dyes and Tans.

CASSIA MARGINATA Roxb.

FAM.—Cæsalpinaceæ.

COM. NS. :—No common names.

CHAR. :—A small or middle-sized deciduous tree. Branchlets and young leaves silky. Bark brown, deeply cracked. Leaflets 30-40 (T. Cooke), 10-15 pairs (Brandis), membranous, glabrous above, oblong, emarginate and apiculate apex, stipules hastate or falcate, early deciduous. Racemes axillary or from the old wood, bracts large, ovate or obovate, caducous. Fl.—pink; petals 1.3 cm. long, longer filaments not thickened in the middle. Fr.—pod, cylindric, 20-30 cm. long. Fl. t.—rainy season.

DISTR. :—Cultivated in gardens as ornamental tree; introduced from Ceylon. South India. Burma.

DESCR. OF WOOD :—Colour light-brown. Pores moderate-sized and large, joined by narrow, undulating, irregular, pale or dark bands of soft tissue, which are much narrower and of smaller cells than in *C. fistula*. Med. rays fine and very numerous, uniform and equidistant, prominent in the dark firm tissue which separates the bands. Very hard, strong, durable. Wt.—75-80 lbs. per c.ft. (Beddome).

USES :—Wood well adapted for articles of turnery, such as naves of wheels and handles of instruments.

CASSIA SIAMEA Lamk.

FAM.—Cæsalpinaceæ.

COM. NS. :—M. Kassod.

CHAR. :—A moderate-sized almost evergreen tree, 9-18 m. high; girth .9-1.8 m. Bark grey, smooth, slightly fissured longitudinally. L.—abruptly pinnate, 15-30 cm., leaflets 12-28, 2.5-7.5 cm., oblong, more or less emarginate with a mucro, sub-coriaceous, glabrous or finely downy, on a small petiolule. Fl.—yellow, .7-2.5 cm., on puberulous pedicels, disposed in corymbose racemes, forming both axillary and terminal panicles, 15-30 cm. Fr.—pod, 7.5-17.5 cm. nearly straight, flat, stalked, brown, many-seeded. Seeds dark-brown, glossy. Fl. t.—nearly all the year round, chiefly in cold season. Fr. t.—Mar.-Apr.

DISTR. :—Introduced. Common throughout the State, often planted along roadsides. Common in the jungles in the south of the Madras State (Beddome), Ceylon, Malay Isles.

DESCR. OF WOOD :—Colour—sap-wood whitish, rather large; heart-wood dark-brown to nearly black, in stripes of dark and light. Pores large and moderate-sized, scanty, embedded in pale, nearly continuous, broad, wavy bands of soft texture, which alternate with very hard, almost black bands of very close texture. Med rays fine, scanty, irregular. On the radial section the wood is streaked light and dark, on a tangential section the dark patches appear as zig-zag plates, and this is the section which would be most handsome in joinery work. Hard, strong, durable; takes fine polish. Wt.—54 lbs. per c.ft.

USES :—Wood used for helves, walking sticks and mallets, also for house posts and beams. Well-adapted for furniture and cabinet work. Used as fuel for locomotives in Ceylon (Beddome).

CASUARINA EQUISETIFOLIA Forst.

FAM.—Casuarinaceæ.

COM. NS. :—*E.* Beef-wood tree. *K.* Chavuku, Gali; *M.* Khadi-sherni, Suru.

CHAR. :—A large evergreen tree, 15-18 m. high; girth 1·2-2·4 m. *Bark* brown, rough, fibrous, peeling off in vertical strips. Glabrous, with leafless, drooping branches terminated by whorled, articulate, thin, slender deciduous branchlets. *Male fl.*—monandrous, in terminal cylindric catkins, about 1·3 cm.; *female fl.*—in small, pedicellate, globose heads, with conspicuous subulate teeth. *Fr.*—a globular oblong cone, of the size of a cherry, formed of the enlarged woody bracts and bracteoles, containing samaroid caryoposis with a membranous wing. *Fl. t.*—Sept.-Oct. *Fr. t.*—ripe in June.

DISTR. :—East side of the Bay of Bengal: Chittagong southwards, Malay Archipelago, Australia. Cultivated elsewhere. There are large plantations of this tree in N. Kanara near the sea-coast. Also in gardens throughout the State.

DESCR. OF WOOD :—*Colour* white, reddish-brown at the centre. *Pores* moderate-sized, in radial and oblique lines. *Med. rays* very fine, uniform, equidistant. Numerous wavy, concentric lines of soft tissue containing small pores join the med. rays. Very hard, heavy; difficult to work, cracks and splits; polishes well. *Wt.*—50 lbs. per c.ft. (young wood); 60 lbs. (old wood).

USES :—Wood used for poles, rafters, masts, oars, yokes, felloes of wheels; has been recommended for wood paving; largely used as fuel. Bark is used as a mordant for dyeing fishermen's nets near Madras; it is also used medicinally. One of the important trees of India from its capability of growing on coast sands close to the sea and thus taking part in the reclamation of sand-dunes. The coast lands once reclaimed by the aid of this tree get easily covered with shrubby and tree-vegetation; and the other trees which would have been difficult to plant at first, can be brought in and a permanent forest constituted. Among such other trees are the Cashew-Nut, Neem, Jambul, Palmyra-Palm and Coconut. The plantation prevents encroachment of sand-drifts and protects the villages and their cultivated lands from destruction. The tree is planted as ornamental tree in gardens and avenues and forms a good fence.

CEIBA PENTADRA (Linn.) Gaertn.

(ERIODENDRON ANFRACTUOSUM DC.)

FAM.—Bombacaceæ.

COM. NS. :—*E.* The white silk cotton tree, Kapok tree; *H.* Hatian, Katan, Safed-Simal, Senibal; *K.* Dudi mara, Bili-lurga, Marali; *M.* Katesawar, Shamiela.

CHAR. :—A moderate-sized tree, growing to large size in Khandesh, 18-24 m. high, girth 3-3.6 m. Trunk straight, armed when young with conical woody prickles; branches spreading horizontally; all parts glabrous. *L.*—5-8 foliolate, on petioles as long as or longer than the leaflets; leaflets 7.8-10.4 × 2.6 cm., lanceolate, acuminate or cuspidate with a mucro, entire or serrulate towards the point, glaucescent beneath, shortly petioluled or almost sessile. *Fl.*—appearing before the leaves, of a dingy white colour, on peduncles about 5.2 cm., fascicled, axillary or terminal, 1-flowered, drooping. Calyx thick, coriaceous, 5-lobed, lobes roundish, glabrous externally, downy within. Petals 5, 2.6 cm., oblong, connate at the base, thick, tomentose outside. Staminal bundles 5, united at the base, each bearing 2-3 variously convolute, linear, 1-celled anthers. Ovary ovoid, 5-celled, thick; stigma entire or 5-lobed. *Fr.*—capsule oblong, thick, coriaceous, 5-valved. Seeds numerous, black, imbedded in a silky wool. *Fl. t.*—Feb.-Mar. *Fr. t.*—Apr.-May. Sheds leaves in cold season; continues leafless till hot season.

DISTR. :—Wild in Khandesh; also in Gujarat, Poona, Konkan and N. Kanara; throughout hotter parts of India. Planted near villages and temples. Burma.

DESCR. OF WOOD :—*Colour* yellowish or brownish-white. *Pores* very large, very scanty, often sub-divided. *Med. rays* fine, the distance between them less than the diameter of the pores, a good silver grain. *Light*, soft. *Wt.*—29 lbs. per c.ft.

USES :—Used for logs, spoons and similar articles; the silky-floss round the seeds furnishes silk-cotton (Kapok) of better quality than *Salmaia malabarica*; used for stuffing pillows, and manufacture of life-buoys; a good insulator.

See—Fibres.

CELTIS CINNAMOMEA Lindl.

FAM.—Ulmaceæ.

COM. NS. :—K. Hartal, Heenari, Henbig, Hitari; M. Brumaj.

CHAR. :—An evergreen tree, 9-12 m. high; girth .75-.9 m. Branchlets tomentose. *Bark* smooth, light-coloured, hard with black or brown irregular bands of almost bony tissue, alternating with white or yellowish, soft tissue. *L.*—when young membranous, when adult chartaceous, 5.6-10 × 2.5-5 cm., obliquely ovate, long-acuminate, entire, crenate or serrate, glabrous, dark-green, 3-nerved to below the tip. *Fl.*—in paniculate cymes, the flowers of the upper panicles all fertile; the lower panicles with upper flowers fertile, the lower male. *Fr.*—drupe, fusiform, narrowed to the obtusely beaked tip. *Fl. t.*—Feb.-Apr.

DISTR. :—Throughout the Konkan and N. Kanara; usually in evergreen forests on the ghats. Outer Himalayas, from Kumaon eastwards; Ceylon, Malay Islands.

DESCR. OF WOOD :—*Colour* yellowish-grey, *An. rings* distinct, *Pores* small, often sub-divided in white lines of tissue; these bands

are continuous in the spring wood and in the remainder of the ring they are wavy and often discontinuous. *Med. rays* moderately broad or fine, short, white. Moderately hard, smooth, shining. *Wt.*—52 lbs. per c.ft.

USES :—Wood used for building purposes in N. Kanara ; used for planking and canoes in Assam.

CELTIS WIGHTII Planch.

FAM.—Ulmaceæ.

COM. NS. :—No common names.

CHAR. :—A middle-sized evergreen tree, 9-12 m. high ; young shoots puberulous, young foliage pink. *L.*—rigidly coriaceous, 7.5-15 × 4.3-6.3 cm., ovate or elliptic oblong, acuminate, entire or sparsely crenate-serrate, conspicuously 3-nerved almost to the tip ; base rounded or acute. *Fl.*—yellow in axillary short cymes, the male and hermaphrodite together, the former below the latter. *Fr.*—drupe, shortly pedicellate, ovoid 6-1.3 cm. long, scarlet.

DISTR. :—Rare in the State ; Deccan-Khandala. Western Peninsula hills ; Ceylon, Malay Islands, Australia.

DESCR. OF WOOD :—*Colour* white or greyish-white. Close-grained. *An. rings* indistinctly marked by a narrow belt without pores ; elsewhere pores small, enclosed in narrow, undulating, concentric, interrupted lines of soft tissue. *Med. rays* fine, numerous, uniform and equidistant. Very hard, smooth, shining. *Wt.*—average 57 lbs. per c.ft.

USES :—Not known.

CERBERA ODOLLAM Gaertn.

FAM.—Apocynaceæ.

COM. NS. :—K. Chanda, Hande, Tande ; M. Sukanu.

CHAR. :—A large evergreen shrub or a small tree, with acrid milky juice ; attains 12-13 m. in height and 9-1.2 m. in girth. Branchlets whorled, marked with leaf-scars. *Bark* white. *L.*—10-15 cm. to 30 cm., oblong-lanceolate or obovate-lanceolate, acuminate, tapering into a slender 2.5-4 cm. petiole, entire and shining. *Fl.*—white, sometimes with a yellowish throat, sweet-scented, in a corymbose terminal pedunculate cyme. Calyx-lobes reflexed, about 1.3 cm., deciduous along with the bract ; bracts coloured, large, very deciduous. Corolla-tube 2 cm. long, sometimes longer, nearly as long or longer than the lobes. *Fr.*—drupe, ovoid, brown, or blackish when ripe, size of an apple. *Fl. t.*—June-Jan. (Cooke). At different times throughout the year (Talbot).

DISTR. :—Salt swamps of the South Konkan and N. Kanara ; planted in hedges near the sea-coast at Murdeshwar. Throughout India in salt-swamps and on the sea-coast, abundant on the Malabar coast. Malay Archipelago, China, Australia, Pacific Islands.

DESCR. OF WOOD :—*Colour* grey. *An. rings* marked by a sharp line. *Pores* small, in short radial lines. *Med. rays* indistinct. Very soft. Spongy. *Wt.*—21 lbs. per c.ft.

USES :—Wood is only occasionally used as fuel. Bark, fruit and milky juice used medicinally. Seeds yield an oil used for burning. Fruit is said to be poisonous.

See—Medicinal Plants, Poisonous Plants, Oils.

CHLOROXYLON SWIETENIA DC,

FAM.—Rutaceæ.

COM. NS. :—*E.* Satin Wood ; *K.* Huragalu, Mashwal ; *M.* Bheria, Billu, Halda.

CHAR. :—A moderate-sized deciduous tree. *Bark* soft, spongy, fissured, light grey or yellow. Young parts, petioles and inflorescence covered with minute grey pubescence. *L.*—abruptly pinnate, 13-23 cm. long. Leaflets 20-40, 1.7-4 × .7-1.3 cm., opposite, sub-opposite or alternate, unequal-sided, obliquely oblong, obtuse at the apex, glabrous on both sides, pale and dotted on the under surface, shortly petiolulate. *Fl.*—white, small, on long villous pedicels, forming large, branched, terminal and axillary panicles. Calyx lobes 5, ovate, acute. Petals 5, free from the base, membranous. Stamens 10 ; filaments free, inserted in the sinuses of the disc. Ovary 3-celled. *Fr.*—capsule, 2.6 × 1.3 cm., oblong, dark-brown, glabrous. *Fl. t.*—Mar.-Apr. *Fr. t.*—Apr.-Oct. New leaves appear in May.

DISTR. :—Common on the Satpuras and the drier parts of the Bombay State ; abundant on the sandstone formation both in the Bijapur and Belgaum districts. Madhya Bharat, and Southern India ; Ceylon.

DESCR. OF WOOD :—*Colour* yellow, or cream coloured, the inner wood darker than the outer, but no distinct heart-wood. Close-grained ; having a fine satiny lustre. *An. rings* distinct. *Pores* very small, evenly distributed, single or in short radial lines, between the fine uniform and equidistant, very short med. rays which are visible on a radial section as small shining plates, which cause the beautiful silver-grain, often handsomely figured. Very hard, very durable and very strong and heavy, fragrant ; polishes well. *Wt.*—60 lbs. per c.ft.

USES :—Wood used for buildings, bridge-construction, piles, furniture, cabinet-work, agricultural implements, oil-mills, well-construction, brush-backs, picture-frames, fancy work, carving and turning, carts and their parts, boats, tool-handles, gunstocks, toys, partition and casing boards of better class railway carriages ; durable enough for railway sleepers but too valuable. Tree is said to yield wood oil and yellow-dye. Not a good fuel, smokes too much.

See—Dyes and Tans, Oils.

CHRYSOPHYLLUM ROXBURGHII G. Don.

FAM.—Sapotaceæ.

COM. NS. :—*E.* Star-apple ; *K.* Bakli, Hale ; *M.* Dongrimaiphall, Tarsi, Tarsiphal.

CHAR. :—A very large evergreen tree, 18-21 m. high; girth 1.2-2.1 m. Young shoots and leaves rusty-pubescent. *L.*—7.5-18 × 2.5-5 cm., elliptic or ovate-lanceolate, produced into a longer or shorter obtuse point, glabrous, entire, short-petioled. *Fl.*—minute, pale-yellow, 5-merous, pedicels axillary, fascicled, recurved, about 4-lin. long. Calyx segments unequal, imbricate. Corolla tube as long as the calyx, lobes obtuse. *Fr.*—berry, spherical or obscurely 5-angled, 2.5-3 cm. diam., when ripe deeply 5-angled, smooth, and yellow. Seeds brown, imbedded in glutinous pulp. *Fl. t.*—Apr.-June. *Fr. t.*—Nov.-Dec.

DISTR. :—Evergreen forests of the Konkan and N. Kanara, common; Western Ghats: Bengal, Ceylon, Burma.

DESCR. OF WOOD :—*Colour* white. Close-grained. *Pores* small in radial lines bending into oblique strings. *Med. rays* numerous, very fine. Moderately hard. *Wt.*—36 lbs. per c.ft.

USES :—Wood used for building purposes; said to be useful for shingles. Fruit is edible, but not palatable.

See—Fruit Trees.

CHUKRASSIA TABULARIS A. Juss.

FAM.—Meliaceæ.

COM. NS. :—*E.* Chittagong Wood; *K.* Dal-mara; *M.* Lal-devadari, Pabba; *Tr.* Chikrassy. (The name Golden Mahagony has been used in Burma).

CHAR. :—A large tree, 18-24 m. high; girth 2.4-3 m. Bark reddish-brown, deeply cracked (Gamble); dark-coloured narrowly longitudinally fissured with short horizontal cracks and a scaly rhytidome, about .67 cm. thick, inner bark 1.34 cm. thick, reddish, fibrous (Talbot). *L.*—31-47 cm. long, alternate. Leaflets 10-16, 5-13 × 3-7 cm., sub-opposite or alternate, obliquely ovate, unequal-sided, acuminate-cuspidate, nearly glabrous or more or less tomentose. *Fl.*—numerous, of a dirty-white or yellowish-white colour (sometimes red) on terminal axillary panicles which are shorter than the leaves. Calyx 5-dentate. Petals 5, sparsely pilose. Staminal tube glabrous, and shortly 10-denticulate. Ovary 3-5-celled, hirsute. *Fr.*—capsule, nearly 5 cm. long, ovoid. *Fl. t.*—Jan.-Feb. *Fr. t.*—hot season.

Var. velulina Roem, is villous, with 4-valved capsule.

DISTR. :—Both the varieties are common in the evergreen forests of N. Kanara and the Konkan (Tungar Hills and Roha). Western Peninsula from the Konkan southwards, Sikkim, Assam, Burma, Cocos Islands.

DESCR. OF WOOD :—*Colour* varying from yellowish-brown to reddish-brown. When freshly cut it is of pale buff colour changing to golden-brown on exposure. Sap-wood of lighter colour. *Pores* scanty, moderate-sized, often oval and sub-divided, isolated, uniformly distributed. *Med. rays* fine, uniform, mostly equidistant, slightly undulating; the distance between the rays generally equal to the transverse diameter of the pores. *An. rings* distinctly marked by a sharp line. A fine silver-grain with satiny lustre. Hard, strong,

moderately durable. Seasons and works well; easily turned and carved and can be brought to a fine finish, takes excellent polish. Wt.—49 lbs. per c.ft.

USES :—Wood used for house-posts, beams, scantlings and plank-ing, ornamental furniture, carving, dug-out canoes, well-construction, cooper's work. Yields a transparent yellow gum; astringent bark used medicinally; flowers yield a red and yellow dye.

See—Gums and Resins, Dyes and Tans.

CICCA ACIDA Merr.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Kali-Kudai, Pan-nana.

CHAR. :—A much-branched, deciduous, dioecious, glabrous, tree; 9-12 m. high. Bark white, smooth, exfoliating in irregular plates, disclosing patches covered with brown thick lines; inner bark with brown regular bands of fibrous tissue. L.—5-11.3 × 2.5-5 cm., oblong, elliptic-lanceolate, membranous, entire. Fl.—Male flowers small, numerous, fascicled, on pedicels 3-4 lin.; disc convex; female solitary or in threes on pedicels 4-5 lin. Styles 3, bi-fid at the apex. Fr.—capsule, globose, depressed, small, bluish. Seed purplish-blue. Fl. t.—Apr.-May. Fr. t.—May-June.

DISTR. :—On the Konkan and N. Kanara ghats in deciduous and evergreen forests. This is the "Pan-Nana" tree of some of the Belgaum evergreen forests. Western Peninsula: Ceylon.

DESCR. OF WOOD :—Colour reddish-white. An. rings distinct. Pores small, equally distributed. Med. rays fine, wavy, white. Hard, tough, smooth, compact. Wt.—54 lbs. per c.ft.

USES :—Wood used for building purposes in Ceylon.

CICCA DISTICHA Linn.

FAM.—Euphorbiaceæ.

COM. NS. :—E. Star Gooseberry; H. Chalmeri, Harfarauri; K. Are-or Kari-or Karu-Rayarnelli; M. Harparrevdi.

CHAR. :—A moderate-sized deciduous tree, 4.5-6 m. high; girth. 6-9 m. Branches erect. Bark grey, smooth. L.—2.5-7.5 × 4 cm., numerous, alternate, pinnately distichous, short-petioled, obliquely ovate-lanceolate (lowermost sometimes orbicular). Fl.—minute, red, numerous, in globular heads in the axils of the fallen leaves; male, female and hermaphrodite, mixed. Calyx segments, 4; disc of 4 glands. Stamens 4, three shorter than the calyx. Ovary ovate; styles short; stigmas 3, 2-cleft. Fr.—drupe, 6-8-grooved, globular, size of a gooseberry, pale-yellow. Fl. t.—May-Nov. Fr. t.—Rainy and cold season. Leafless in Apr.

DISTR. :—Cultivated in gardens all over the State; cultivated in India. Native of Malay Islands and Madagascar.

DESCR. OF WOOD :—Colour light-brown. Pores small, numerous, in radial lines between the fine to moderately broad, numerous, regular but short med. rays. Moderately hard,

USES :—Wood not used. The fruit is eaten raw and pickled and is made into preserves and tarts. Bark used for tanning in S. India. Root, fruit and seeds used medicinally.

See—Medicinal Plants, Fruit Trees, Dyes and Tans.

CINNAMOMUM ZEYLANICUM Blume.

FAM.—Lauraceæ.

COM. NS. :—*E.* Wild Cinnamon tree; *G.* Dalchini, Taj; *H.* Dalchini, Darchini, Kash; *K.* Dalchini, Lavange-hakke, Nisane; *M.* Dalchini.

CHAR. :—A middle-sized evergreen tree; branchlets compressed, grooved. 9-12 m. high, girth 1.2-1.5 m. *Bark* brown, 1.3-2 cm., thick, rough in very old trees; inner bark reddish. *L.*—opposite or sub-opposite, 7.5-12.5 × 4.7-5 cm., rigid, more or less coriaceous, elliptic-lanceolate, obtusely pointed at the apex, more or less acuminate and sometimes unequal at the base, glabrous and shining above, glaucous beneath, 3-5 nerved. *Fl.*—tomentose, small, usually hermaphrodite, on long terminal, corymbose panicles equalling the leaves, the ultimate ramifications 3-flowered. *Fl. t.*—Nov.-Mar. *Fr. t.*—June-Aug. Every part of the plant when bruised gives a powerful odour of cinnamon.

DISTR. :—Rain forests, along the ghats from the Konkan southwards. Very common in the N. Kanara district. Western Peninsula, Burma, Ceylon, Malay Peninsula, indigenous and cultivated. Cultivated in the Malay Islands and elsewhere in the tropics.

DESCR. OF WOOD :—*Colour* light-red. Close-grained. *Pores* moderate-sized, often sub-divided, surrounded by open tissue often of darker colour. *Med. rays* fine, brown, bent where they touch the pores, giving a shining silver-grain on a radial section. Moderately hard. *Wt.*—36 lbs. per c.ft.

USES :—Wood is not used. Bark is used as condiment. Bark and oil from bark, leaves and berries are used medicinally. Leaves are used for flavouring.

See—Medicinal Plants, Condiments and Spices.

CLAUSENA INDICA Oliv.

FAM.—Rutaceæ.

COM. NS. :—No common names.

CHAR. :—A small unarmed tree or a large shrub; branchlets slender, puberulous. *Bark* smooth. *L.*—7-11-foliolate, 10.4-26 cm. long, glabrous, common petiole slender, round, glabrous or puberulous. Leaflets, 5.2-10.4 cm., alternate, elliptic or ovate lanceolate, obtuse, notched, acute or obtusely acuminate, very oblique, crenulate, sub-coriaceous, shining, dark and marked with prominent glands on both surfaces when dry. *Fl.*—1.34 cm. diam., pentamerous, glabrous, white, on very short pedicels, in terminal, corymbiform panicles as long as the leaves; peduncle hoary. Petals ovate-oblong, elliptical. Stamens 10, alternate shorter; filaments dilated below and

inserted on an elongated disc. Anthers small. Ovary globose or oblong, glabrous, verrucose with pellucid glands, 2-sometimes 3-5 celled. Style deciduous; stigma 4-lobed: *Fr.*—berry, 1.34 cm. diam., globose, yellow, pulpy, 1-2 celled; cells 1-2 seeded, usually 1-seeded. Seeds oblong. *Fl. t.*—Mar. *Fr. t.*—rainy season.

DISTR. :—Konkan, common in the evergreen forests on N. Kanara ghats from Ainshi southwards, Anamalais, Ceylon.

DESCR. OF WOOD :—Close-grained. Hard.

USES :—Adapted for the lathe. Leaves are aromatic and eaten in curries.

See—Condiments and Spices.

CLEIDION SPICIFLORUM Merr.

(CLEIDION JAVANICUM Bl.)

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A glabrous evergreen middle-sized tree, 4.5-6 m. high; girth .9-1.2 m. *Bark* grey, rough with a powdery surface, of small raised corky cells; inner bark thick, hard, yellowish. Young shoots puberulous. *L.*—10-18 × 4-7.5 cm., lanceolate or elliptic-lanceolate, acute or acuminate, glabrous, serrate or sub-entire, glabrous, dark-green above, paler beneath; petiole slender, 2.5-5 cm. *Male fl.*—small, on slender pedicels, in small clusters, 2-5, arranged in axillary slender racemes. *Female fl.*—longer on a long pedicel, solitary in the axil of the leaves. Ovary 2-3-celled; styles 2-3 united at the base, 2-cleft. *Fr.*—capsule, 2-3-cocci, about 2.5 cm. diam. Seeds variegated, size of a large pea. Seeds arillate when young. *Fl. t.*—Oct.-Dec. *Fr. t.*—Jan.-Feb.

DISTR. :—Evergreen forests of the Konkan and N. Kanara. Common in Ainshi ghat forests. W. Peninsula, Assam, Chittagong, Burma, Ceylon, Java.

DESCR. OF WOOD :—*Colour* greyish-white. Close-grained. *Pores* moderate-sized, scanty. *Med. rays* moderately broad, very indistinct. Soft, fibrous, rather heavy, not durable; takes good polish. *Wt.*—34 lbs. per c.ft. (Travancore specimen) (Gamble).

USES :—Wood used for building purposes in Madras State.

CLEISTANTHUS MALABARICUS Muell.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Hole-hutige.

CHAR. :—A large shrub or a small tree. Branchlets rufo-villous, *L.*—6.3-15 × 2.5-4.5 cm., obovate-lanceolate, shortly cuspidate, acuminate glabrous above by age, rufescent-pubescent beneath, narrowed at the base, on a very short, densely rufo-villous petiole. Stipules longer than the petiole, acuminate. *Fl.*—glomerulate, sessile or sub-sessile in the axil of leaves. Calyx segments glabrous,

Petals obovate-spathulate, slightly 3-lobed. Ovary with tawny hairs. *Fr.*—capsule, globose, 3-celled. Seeds rugose, 3-angled. *Fl. t.*—Nov.-Jan. *Fr. t.*—Jan.-Feb.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, usually near streams and rivers. In the forests near the falls of Gairsappa, near the river banks above the great (Rajah) fall. Western Peninsula.

DESCR. OF WOOD :—*Colour* reddish-brown. Close-grained. *Pores* in short distant radial strings between the fine regular numerous *med. rays*. Hard.

USES :—Not known.

CLERODENDRON PHLOMIDIS Linn. f.

FAM.—Verbenaceæ.

COM. NS. :—G. Arni, Irun; H. Urni; M. Airanmula.

CHAR. :—A large bush or a small tree, reaching 9 m. high. *Bark* light-brown, thin, smooth. *L.*—4.6.3 × 3.1.4 cm., ovate or sub-rhomboid, obtuse or acute, coarsely crenate-dentate, undulate, glabrous above, puberulous beneath, base truncate or sub-cordate. *Fl.*—moderate-sized, fragrant, in small dichotomous axillary cymes arranged so as to form a rounded terminal panicle. Corolla white or pinkish, tube nearly 2.5 cm. long; lobes nearly equal, veined. *Fr.*—drupe, broadly ovoid, depressed. *Fl. t.*—Aug.-Feb.

DISTR. :—In the dry districts of the State, usually in hedges. Scarce in the forests of Gujarat; common in the south of Dharwar, also in the Belgaum district. From the north-western Himalayas, Terai to Ceylon in the drier climates.

DESCR. OF WOOD :—*Colour* grey. Close-grained. *An. rings* faintly visible. *Pores* small, in short radial lines of 1 to 4, chiefly in spring wood. *Med. rays* numerous, fine, distinct. Hard.

USES :—Wood not used.

COCHLOSPERMUM RELIGIOSUM (L.) Alst.

(COCHLOSPERMUM GOSSYPIUM DC.)

FAM.—Cochlospermaceæ.

COM. NS. :—H. Kumbi, Gabdi, Galgal; K. Kad-buroga; M. Ganglay, Galgal, Ganeri.

CHAR. :—A small deciduous tree, with short thick spreading branches, 6-9 m. high, with a girth .6-.9 m. *Bark* 2.6 cm. thick, fibrous, deeply furrowed; inner substance red. Branchlets, young leaves, and peduncles grey-tomentose. *L.*—7.8-20.8 cm. diam., palmately 3-5-lobed, old glabrous, lobes acute or acuminate, entire; petioles long, thick; stipules linear, caducous. *Fl.*—10.4-13 cm. diam., bright yellow, on terminal panicles. Sepals oblong, concave, silky. Petals obcordate, obliquely emarginate or irregularly cleft. *Fr.*—capsule, 5.2-7.8 cm., 5-lobed, size of a goose-egg. Seeds

numerous, covered with long cottony hairs. *Fl. t.*—Feb.-Apr. *Fr. t.*—June-July. Sheds its leaves in Jan.; new leaves appearing in May.

DISTR. :—Deccan, Gujarat, common in the Khandesh Satpudas on the trap; also in the Belgaum district on Kaladgi quartzite; forests at the base of the Western Himalayas, from the Sutlej eastwards, Madhya Bharat. Burma. Cultivated in Ceylon near temples.

DESCR. OF WOOD :—*Colour* greyish-brown. No heart-wood. *Pores* large, scanty, often sub-divided into compartments. *Med. rays* broad, visible on a radial section as long rough plates. Extremely soft and light. When dry nothing but a loose bundle of fibres, when green a soft spongy mass. *Wt.*—17 lbs. per c.ft.

USES :—Wood is quite useless. Cotton covering seeds is one of the silk cottons or “Kapok fibres” of India, and is used for stuffing pillows and life belts. The seeds give an oil which is little used. White gum exuding from the trunk is known as “Katira”. The bark yields a cordage fibre. Though of no value for its wood, the tree is useful as helping to reforest bare rocky denuded hills, and so pave the way for more valuable species.

See—Fibres, Gums and Resins.

COCOS NUCIFERA Linn.

FAM.—Palmeæ.

COM. NS. :—*E.* Coconut Palm, Porcupine-wood; *G.* Narial, Naliyar; *H.* Narial; *K.* Tare, Tengin-mara, Tengu; *M.* Mad, Naral; *Tr.* Porcupine-wood.

CHAR. :—A tall tree, 12-24 m. high; trunk grey or greyish-brown, more or less straight, marked with annular leaf-scars; base surrounded by a mass of rootlets. *L.*—1.8-4.5 m. long, leaflets equidistant 60-90 cm., linear-lanceolate, coriaceous. Spadix 1.2-1.8 m., stout, simply paniced, lower spathes splitting lengthwise. *Fl.*—unisexual. *Fr.*—drupaceous nut, 20-30 cm., 3-gonously sub-globose, green or yellowish; cavity large filled with sweet, somewhat milky fluid. *Fl. t.*—throughout the year. *Fr. t.*—fruit ripens 9-10 months after flowering.

DISTR. :—Cultivated throughout the State extensively near the sea. Common in Konkan and N. Kanara; cultivated inland also. Lower basins of the Ganges and the Brahmaputra. S. India, Malabar, Coromandel coasts: Islands of the Indian Ocean, Ceylon, coasts of America and Africa (Tropics).

DESCR. OF WOOD :—Hard, red outside, reddish-brown and softer inside, but not hollow; fibro-vascular bundles red, the horny part in section rounded, or irregularly shaped, cordate, with one or more large pores in the sinus; on a vertical section wood is prettily streaked. *Wt.*—about 57 lbs. per c.ft. (varies considerably).

USES :—Wood used for rafters, ridge-poles, house-posts, spear handles, walking sticks, furniture, turning, fancy work, pags for tents. The wood makes very pretty and durable furniture. The leaves are used for thatching, and the net of fibres at the base of the leaf-stalk is made into bags and paper, and is used in Ceylon for toddy-straining. The cut flower-stalks yield toddy which is fermented into alcohol or

made into sugar. The kernels of the nuts (copra) are eaten ; the sweet fluid of the young nut is a pleasant drink ; the thick fibrous rind of the fruit yields the "coir" fibre used for ropes, mats and other articles ; the shell of the nut is made into spoons, cups and other utensils ; oil obtained from the kernel is an important article of trade, and is used for burning, cooking and in manufacture of soaps. Root-bark, flowers, fruit, fermented juice and oil are used medicinally.

See—Medicinal Plants, Oils, Fibres, Fruit Trees, Liquors.

COMMIPHORA MUKUL Engl.

(BALSAMODENDRON MUKUL Hook.)

FAM.—Burseraceæ.

COM. NS. :—*E. Gum-Gugul* ; *G. Guggule*, *Mukul* ; *H. Gugul* ; *K. Guggula* ; *M. Guggula*.

CHAR. :—A small tree, usually a stunted bush, 1·2-1·8 m. high. *Bark* greenish-yellow, ash-coloured, exfoliating in rough flakes ; under-bark bright, shining, peeling off in long thin papery scrolls. Branches frequently ending in a spine. *L.*—alternate, generally crowded towards the ends of short branchlets, 1-3-foliate. Leaflets obovate, toothed towards the apex, almost sessile and shining, the terminal the largest. *Fl.*—small, unisexual, of a reddish colour, 2 or 3 in a fascicle ; the male with a short abortive ovary, and the female with sterile imperfect anthers. Calyx tubular, 4 (5)-cleft, glandular-hairy. Petals 4-5, strap-shaped, longer than the calyx. Stamens 8-10, inserted on the 8-10-toothed disc. Stigma 2-lobed. *Fr.*—drupe, red when ripe, ovoid, spiculate, smooth, containing two 2-celled stones. *Fl. t.*—Mar.-Apr. Sheds leaves in cold season ; new leaves in May.

DISTR. :—Abundant on rocky ground in arid zones in Khandesh, Deccan, Mysore, Saurashtra, Rajasthan, Bihar, Sind, Baluchistan, Arabia.

DESCR. OF WOOD :—*Colour* white. Even-grained. *Pores* small. *Med. rays* fine, short. Soft, light.

USES :—Wood is not used. The tree yields a gum called "Gugul" or Indian Bdellium, which is obtained from the incisions made in the bark ; used in Indian medicine.

See—Medicinal Plants, Gums and Resins.

CORDIA DICHOTOMA Fent. f.

(CORDIA MYXA Linn.)

FAM.—Boraginaceæ.

COM. NS. :—*E. Sebastan Plum* ; *G. Pistan*, *Rayagundo* ; *H. Bhokar*, *Lassora*, *Rasalla* ; *K. Challa*, *Hadige*, *Mannadike* ; *M. Bargund*, *Bhokar*, *Gondani*.

CHAR. :—A large shrub or a moderate-sized deciduous tree, 7·5-12 m. high; girth 9·1·5 m., branchlets glabrous. *Bark* thick, brownish, rough, longitudinally fissured; inner bark fibrous. *L.*—7·5-15 × 6·3-10 cm., broad-ovate or orbicular, rounded or slightly cordate at the base, entire, smooth above, paler beneath; petiole 2·5-5 cm. *Fl.*—small, white, sessile or subsessile in loose, terminal, axillary pedunculate cymes. Calyx-lobes silky, pubescent inside. Corolla-tube the length of the calyx, glabrous. *Fr.*—drupe, 2·2·5 cm. long, ovate or globular, pale-yellow, supported by the enlarged calyx; pulp very viscid. *Fl. t.*—Mar.-Apr. *Fr. t.*—June-Sept. Sheds leaves in Mar.-Apr.; new leaves in May.

DISTR. :—Dry, deciduous and moist monsoon forests, throughout the State, in Western ghats, Satpudas. Common in Gujarat, Konkan and N. Kanara; often planted; throughout India, wild and cultivated: Sind, Ceylon, Egypt, Indo-China, and tropical Australia.

DESCR. OF WOOD :—*Colour* greyish-brown. *Pores* moderate-sized or large, scanty, scattered and frequently double or partitioned, joined by concentric bands of tissue which consist of large rectangular and six-angled wood cells; the alternate bands denser and closer in texture. *Med. rays* short, moderately broad, shallow, prominent on a radial section as a mottled silver-grain. Moderately hard; rather light; fairly strong; seasons well, but is not durable. *Wt.*—33 lbs. per c.ft.

USES :—Wood used for house-posts, beams, scantlings, planking, dug-out canoes, carts, well-curbs, agricultural implements, combs, gun-stocks, naves, spokes and felloes of wheels, furniture, bowls and other utensils; might be tried for tea-boxes. Excellent fuel. Raw fruits used as vegetable or pickled. Ripe ones eaten. The adhesive viscid pulp is used as bird-lime, and for marking linen instead of marking nut, but the mark is apt to fade. Bark is made into ropes and the fibre is used for caulking boats. The leaves are used as plates and as cheroot wrappers in Burma. The leaf juice is said to be used in dyeing. Bark, leaves (rarely) and fruits are used medicinally.

See—Medicinal Plants, Fibres, Fruit Trees, Dyes and Tans.

CORDIA MACLEODII Hook. f. & T.

FAM.—Boraginaceæ.

COM. NS. :—*H.* Dahi-palas, Dewan, Dhaian, Dhengan; *K.* Tadang; *M.* Bhoti, Daiwas, Dhaiwan, Dhain.

CHAR. :—A middle-sized deciduous tree, 9-12 m. high; girth 9·1·2 m. *Bark* smooth, white, soft, corky. Young shoots, inflorescence and calyx woolly or tawny-tomentose. *L.*—12·5-18 cm. and nearly as broad, alternate or sub-opposite, almost orbicular, cordate at the base, pubescent and rough above, on a petiole 5·7·5 cm. *Fl.*—white, small, on axillary and terminal cymes. Calyx 5, unequally toothed, sometimes 3-cleft, ribbed externally. Corolla-lobes undulate, spreading, or reflexed. Male flowers with a rudimentary ovary. *Fr.*—drupe, 1·3 cm., oval, crowned with the persistent base

of style and supported by the calyx. *Fl. t.*—Mar.-Apr. *Fr. t.*—cold season.

DISTR. :—Forests of N. Kanara, Belgaum and the Konkan ; often planted as a roadside tree in southern drier districts. Mawal, Madhya Bharat, Western Peninsula.

DESCR. OF WOOD :—*Colour*—heart-wood light-brown, beautifully mottled with darker viens. Even-grained. *Pores* small to moderate-sized in irregular concentric belts of light tissue, often joined by white lines without pores. *Med. rays* white, fine and moderately broad, prominent. Very hard, tough. *Wt.*—52 lbs. per c.ft.

USES :—Wood used for carts and their parts, agricultural implements, furniture, fishing rods (which are said to be excellent), carving, turning and other ornamental works. A handsome wood suitable for cabinet work. Leaves and young shoots fodder for buffaloes.

See—Fodder Plants.

CORDIA ROTHII Roem & Schult.

FAM.—Boraginaceæ.

COM. NS. :—*H.* Gund, Gundi, Gundni ; *K.* Kadchellai, Kiriseli, Narvalli ; *M.* Gondani.

CHAR. :—A small or moderate-sized deciduous tree, 6-12 m. high ; girth .9-1.5 m. *Bark* grey with deep longitudinal fissures. *L.*—7.5-10 × 2.5-4 cm., oblanceolate, obtuse, sub-opposite, entire, mucronate, rough, tapering to a petiole, 1.3 cm. *Fl.*—small, white, numerous, 4-5-clcft, on terminal and axillary pedunculate cymes. Corolla-lobes 4-5-reflexed. Stamens 4-5. *Fr.*—drupe, size of a pea, orange-yellow, longitudinally striated. *Fl. t.*—Apr.-June. *Fr. t.*—cold season.

DISTR. :—Throughout the dry districts of the State ; often planted and self-sown along the bunds of tanks and near villages ; dry zones of North-West and Southern India, Madhya Bharat ; plentiful in Rajasthan.

DESCR. OF WOOD :—*Colour*—sap-wood yellowish ; heart-wood brown, streaked in different shades. *Pores* small to moderate-sized, joined by concentric bands of loose texture of varying width and sometimes anastomosing. *Med. rays* fine and moderate-sized, prominent in the dark hard tissue between the concentric belts above referred to. Hard, compact, tough. *Wt.*—48 lbs. per c.ft.

USES :—Wood is used for buildings in Sind, and in Cutch for agricultural implements ; valuable for making carriage poles ; also for combs, bowls and other utensils. Bark when wounded gives a gum, and the fibre is made into ropes. The pulp of the fruit is eaten.

N.B.—The wood is a fine one and deserves to be better known and the tree to be more propagated (Gamble).

See—Fibres, Gums and Resins, Fruit Trees.

CORDIA WALLICHII G. Don.

FAM.—Boraginaceæ.

COM. NS. :—G. Pistan, Sepistan; H. Bara-lesura; K. Chandle; M. Burgund, Dahiwan.

CHAR. :—A moderate-sized tree. L.—10-12·5 m. long and about as broad as long, orbicular-ovate, glabrous and without white disks above, densely tomentose beneath, base sub-cordate or truncate. Fl.—white in terminal and lateral paniculate cymes. Calyx closed round the corolla in bud, irregularly splitting into 5 lobes on expansion of the flower, pubescent inside; tube glabrous, teeth densely tomentose. Corolla about twice as long as the calyx; Filaments hairy at the base. Fr.—drupe, ovoid, long-acuminate (Talbot). Fl. t.—Dec.-Jan. Fr. t.—Apr.-May.

DISTR. :—Common in Gujarat and in the drier districts of the State; also in the Mundgod sub-division of N. Kanara in deciduous forests; Western Peninsula and Mysore.

DESCR. OF WOOD :—Practically the same as *C. Dichotoma*.

USES :—Uses of this tree are the same as those of *C. Dichotoma*.

CRATÆVA NURVULA Ham.

FAM.—Capparidaceæ.

COM. NS. :—H. Barna, Biliana, Bilasi; K. Bitusi, Narave, Nirvala, Hole Lakki; M. Kumla, Karwan, Hadwurna, Waiwurna.

CHAR. :—A moderate sized deciduous tree, 9-12 m. high with a girth of 9·1·8 m. Bark grey, 1·34 cm. thick, with long horizontal wrinkles. Glabrous with lenticels on branches. L.—trifoliolate, long-petioled, clustered towards the ends of branches; leaflets ovate-lanceolate or obovate-lanceolate, abruptly or gradually acuminate, on articulate petioles, pale or glaucous beneath. Fl.—5·2·7·8 diam., white, becoming greenish-yellow, at length purplish, on long filiform pedicels, in many-flowered terminal corymbs. Sepals 4, ovate, inserted with the petals on the broad-lobed hemispherical disc. Petals 4, ovate or oblong, obtuse or acute, long clawed. Fr.—2·6·5·2 cm. diam., ovate or globose, on a thick gynophore, many-seeded. Fl. t.—hot season Mar.-Apr. Young leaves appear in the same season. Fr. t.—rainy season.

DISTR. :—Throughout India from the Punjab southwards, chiefly in low-lying shady places, often near banks of streams; found all over the Konkan, Malabar, Kanara, Madras, Assam, Ceylon, Burma; often planted near temples and Muslim tombs. Tonkin, China, Formosa, Malay Archipelago, Polynesia and tropical Africa.

DESCR. OF WOOD :—Colour yellowish white, when old turning light brown. Pores moderate-sized, numerous and uniformly distributed, often sub-divided, each pore surrounded by a whitish ring. Med. rays short, very wavy, fine and moderately broad, the distance between the rays slightly greater than the transverse diameter of the pores. Close and smooth grained, tough, and

moderately hard, not durable but seasons well. *Wt.*—42 lbs. per c.ft.

USES :—Wood used for furniture, drums, combs, models, writing boards and turnery ; a possible substitute for boxwood for engraving and other purposes. Leaves used in Ceylon as a stomachic. The viscid pulp of the fruit is said to be used as a mordant in dyeing ; mixed with mortar as a cement.

See—Medicinal Plants.

CROTON OBLONGIFOLIUS Roxb.

FAM.—Euphorbiaceæ.

COM. NS. :—*H.* Chucka ; *M.* Gunsur.

CHAR. :—A middle-sized tree, 6-9 m. high, sometimes 12 m., girth 6-9 m. *Bark* 2.5 cm. thick, grey or brownish ; inner bark red, coarsely fibrous. Young parts and inflorescence clothed with silvery scales. *L.*—12.5-25 × 9-10 cm., oblong-lanceolate or elliptic-obovate, acute or acuminate, pale-green, glabrous, dentate, crowded towards the apex of branches, petioles 2.5-5 cm., stipules small, caducous. *Fl.*—small, yellowish-green, male and female together on short pedicels in the axils of minute bracts in long terminal racemes. Calyx segments 5 ; petals woolly ; stamens 10-12 ; styles 3, 2-cleft. *Fr.*—capsule, sub-globose, 3-lobed. *Fl. t.*—Feb.-Apr. *Fr. t.*—Apr.-May. Leafless in the hot season.

DISTR. :—Rare. Southern Konkan. Kumta taluka of N. Kanara. South India, sub-Himalayan tract from Oudh and Gorakhpur eastwards ; Bengal, Bihar. The Santal Paraganas, Chota-Nagpur : Burma, Ceylon.

DESCR. OF WOOD :—*Colour* yellowish-white. *Pores* moderate-sized, often sub-divided, or in groups of 3 to 4, scanty. *Med. rays* fine, and very fine, very numerous. Wavy concentric bands of loose pale tissue. Moderately hard, heavy.

USES :—Root, bark, leaves and seeds used medicinally. It is frequently planted for ornament.

See—Medicinal Plants.

CRYPTOCARYA WIGHTIANA, Thw.

FAM.—Lauraceæ.

COM. NS. :—*K.* Gulmur.

CHAR. :—A large evergreen tree ; 6-10.5 m. high ; young shoots and leaves minutely tawny hairy. *Bark* thin with large open lenticels ; inner bark hard, reddish mottled. *L.*—5-15 × 2.5-6.3 cm., elliptic or ovate-oblong, acute or acuminate at the apex, obtuse or acute at the base, rigidly coriaceous, glabrous and shining above, pubescent on the veins beneath. *Fl.*—yellow, small, numerous, shortly pedicelled on terminal or terminal and axillary panicles, yellowish-tomentose. *Fr.*—oblong, ellipsoid, 1.3 cm. long, black

when ripe. *Fl. t.*—Nov.-Jan. (Talbot). Dec.-Apr. (Cooke). *Fr. t.*—May-June.

DISTR. :—Western Peninsula from N. Kanara southwards to Ceylon in the evergreen forests. Common on the Yellapur Ghats.

DESCR. OF WOOD :—*Colour* pale brownish-yellow. *Pores* moderate-sized, regularly distributed, thick and pale-walled. *Med. rays* fine, regular. Moderately hard, durable, strong.

USES :—Wood considered valuable for building purposes ; also used for sugarcane mills.

CUPRESSUS TORULOSA Don.

FAM.—Coniferæ.

COM. NS. :—*E.* Himalayan Cypress ; *H.* Devadar, Deviduar ; *M.* Deodar ; *Tr.* Cypress.

CHAR. :—A tall evergreen tree, 21-24 m. (in favourable circumstances even 45 m.) ; girth 1·8-2·4 m. (in favourable circumstance 5·1 m.). *Bark* greyish-brown, peeling off in narrow longitudinal strips, often running somewhat spirally up the tree from left to right ; inner substance reddish-brown. Branches whorled, with drooping extremities, sometimes erect, forming a pyramidal crown of dark-green foliage ; branchlets round or absolutely tetragonous. *L.*—very small, ovate-triangular. Cones numerous, 1·3 cm. diam., consisting of rugose scales enclosing several compressed seeds with an orbicular wing. *Fl. t.*—Jan.-Feb. Cones formed Oct.-Nov.

DISTR. :—Cultivated in gardens in Bombay and Poona and Calcutta. Native of Himalayas and Nepal.

DESCR. OF WOOD :—*Colour*—sap-wood white ; heart-wood light-brown with darker streaks, very fragrant. *An. rings* distinctly marked by a narrow, firm and dark-coloured belt. *Med. rays* very fine and extremely fine, moderately long, very numerous, cells with resin in lines near the annual rings, in very old trees very numerous. Moderately hard, straight-grained and even-textured ; much freer from large knots ; extremely durable ; presents no difficulties in seasoning ; non-refractory, rather strong, extremely durable, easy to saw and work, finishes to a smooth clean surface ; very sturdy wood ; it does not exude any oil, like deodar, and can therefore be painted or polished. A very valuable wood of fine quality. *Wt.*—38 lbs. per c.ft.

USES :—Wood used for furniture and cabinet-making, shoulder-poles and for carving images, suitable for railway sleepers, also used for bridge building ; it might be suitable for air-craft work. It is often burnt as incense in temples.

See—Gums and Resins.

CYCLOSTEMON CONFERTIFLORUS Hook. f.

FAM.—Euphorbiaceæ.

COM. NS. :—*K.* Augai-mara.

CHAR. :—A large tree. *Bark* grey, smooth. *L.*—coriaceous, 10-20 × 4-7·5 cm., oblong or elliptic-oblong, obtusely acuminate,

glabrous, with undulate margins, base acute, unequal sided. *Fl.*—Male and female. Male flowers in clusters in axils or on the old wood. Sepals 5, disk funnel-shaped, radiately ribbed inside and with a membranous lobed border; stamens 20, outside the disk. *Fr.*—drupe, yellow, smooth, size of a small orange, flattened, 2-seeded. Seeds plano-convex, 2 cm. long, rough. *Fl. t.*—Dec. *Fr. t.*—Apr.

DISTR. :—In the evergreen forests between the Devimani Ghat and the Yena rocks, N. Kanara, southwards to Travancore.

DESCR. OF WOOD :—*Colour* olive-grey. *Pores* small, often in lines between the fine, close, uniform, wavy, *med. rays*. *An. rings*. distinct, marked by a ring of dark tissue. Hard, smooth, compact. *Wt.*—56 lbs. per c.ft.

USES :—Fruit used for poisoning fish.

See—Fish Poisons.

CYNOMETRA RAMIFLORA Linn., Var. MIMISOIDES Baker.

FAM.—Cæsalpinaceæ.

COM. NS. :—No common names.

CHAR. :—An evergreen tree. *Bark* smooth, brownish grey. *L.*—7.5-12.5 cm. long; rachis grooved. Leaflets 2 pairs 4.9×2.4 cm., coriaceous, obliquely obovate-oblong, emarginate, dark-green, glabrous, shining above. *Fl.*—in small axillary corymbose racemes. Calyx tube very short; segments ovate-lanceolate. Petals white, linear lanceolate. *Fr.*—pod, fleshy, much wrinkled, turgid, 1.3-2.5 cm. long, irregularly oblong or ovoid with a thick fleshy pointed tip. *Fl. t.*—Mar.-May. *Fr. t.*—ripe Aug.-Sept.

DISTR. :—Western Peninsula in the forests of Konkan and N. Kanara; growing near the sea-coast; Sundribans: Burma, Malaya.

DESCR. OF WOOD :—*Colour* red. Close-grained. *Pores* small, often oval and sub-divided, in patches of loose texture, joined by pale, soft, wavy bands, which alternate with narrower bands of firm tissue. *Med. rays* fine, very numerous. Hard. *Wt.*—56-48 lbs. per c.ft.

USES :—Wood is used for house and cart building, and chips of wood give a purple dye in water. In the Sundribans it is used for building huts and for fuel.

See—Dyes and Tans.

DALBERGIA LANCEOLARIA Linn.

FAM.—Papilionaceæ.

COM. NS. :—*G.* Gengri; *H.* Bithua, Takoli; *K.* Harrani; *M.* Dandous, Kaurchi.

CHAR. :—A beautiful deciduous tree with a straight trunk, 9-12 m. (in some places 18-24 m.) high; girth 1-2-1.5 m. *Bark* compact,

grey, exfoliating in thin rounded patches, glabrous. *L.*—7.5-15 cm., imparipinnate. Leaflets 11-15, 2.5-5 × 2.5 cm., oval, or broadly oblong, emarginate, obtuse or retuse, coriaceous, green above, and rather glaucous below. *Fl.*—pale-blue, on short, slender pedicels, arranged in large, lax, terminal and axillary panicles; branches of panicles sub-glabrous, or clothed with rufous pubescence. Calyx hoary, the teeth obtuse, the lowest rather longer and narrower. Corolla 2-3 times as long as the calyx; standard obovate; keel much shorter than the wings. Stamens 10, diadelphous. *Fr.*—legume, 4-10 × 2.6 cm., brown, flexible, narrowed at both ends, with a long stalk. Seeds 1-4 (usually 2). *Fl. t.*—Mar.-May. *Fr. t.*—ripens next cold season and remains long on the tree.

DISTR. :—Plains from the W. Himalayas to Ceylon. In the deciduous forests of N. Kanara from Mundgod to Siddapur, common; Konkan and Khandesh.

DESCR. OF WOOD :—*Colour* white or yellowish-white; no heart-wood. *An. rings* marked by thin concentric lines. *Pores* scanty, large and moderate-sized, often oval and sub-divided, very prominent in longitudinal section, surrounded by a thin ring of light tissue, alone or joined by very fine wavy and broken faint concentric bands. *Med. rays* very fine, numerous, regularly distributed. Moderately hard, strong, polishes well, not durable. *Wt.*—50 lbs. per c.ft.

USES :—Wood is said to be used for house-building and many other purposes. Oil from seeds and bark is said to be used medicinally.

DALBERGIA LATIFOLIA Roxb.

FAM.—Papilionaceæ.

COM. NS. :—*E.* Black-wood of Bombay, Rosewood of S. India; *G.* Sissu; *K.* Biti, Thodagatti; *M.* Kalarukh, Sissum, Sissoo; *Tr.* Rosewood or Bombay Black-wood.

CHAR. :—A tall deciduous tree, trunk erect, 18-24 m. high, girth 9-1.8 m. (sometimes even 6 m.). *Bark* grey with irregular short cracks, exfoliating in thin, fibrous, longitudinal flakes. Glabrous. *L.*—10-18 cm. on straight petiole. Leaflets usually 5 (3-7), 4-6.5 × cm. long and broad, often emarginate at the apex, cuneate at the base, entire, somewhat undulate, coriaceous, green or whitish beneath, on petiolules 3-4 lin. *Fl.*—small, greenish or white, on short pedicels, forming lax, branched and divaricating panicles, shorter than the leaves. Calyx segments oblong, obtuse, shorter than the tube. Stamens 9, monadelphous; sheath open on the upper side. *Fr.*—legume, oblong-linear or oblong-lanceolate, firm, brown, 4-7.5 × .7-2 cm. 1-4-seeded. *Fl. t.*—hot season. *Fr. t.*—Dec.-Jan. Sheds leaves in Feb.-Mar; new leaves Apr.-May.

DISTR. :—Throughout the Western Ghats and in the deciduous forests of the State. Common in S. Konkan and S. M. Country; Madhya Bharat, E. Bengal, Oudh, Sikkim, Burma.

DESCR. OF WOOD :—*Colour*—sap-wood yellow, small; heart-wood dark-purple, with black longitudinal streaks. Close-grained.

No distinct *an. rings*. *Pores* moderate-sized to large, often subdivided irregular, scanty, in patches of light tissue which are generally joined by narrow, white, wavy, interrupted, concentric lines. *Med. rays* fine, numerous; uniform, equidistant and very short. Extremely hard; slightly heavier and a good deal harder than teak, fairly durable; can be air-seasoned and kiln-seasoned without difficulty; not difficult to saw or work to a beautiful smooth finish. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for high class furniture, door and window frames, carts and their parts, ploughs, well-construction, tool-handles, measures for grain and oil, etc., bowls, jars, snuff-boxes, spoons, knee-timbers of boats, combs, brush-backs, walking-sticks, toys, internal panels and decorative mouldings of railway carriages, cooper's work. Largely used by Ordnance Department for ammunition boxes, carts, etc. Rosewood is well-known on the European markets as a fine cabinet-wood. Young twigs and leaves are much esteemed as cattle fodder in N. Kanara.

See—Fodder Plants.

DALBERGIA MELANOXYLON Guill. & Per.

FAM.—Papilionaceæ.

COM. NS. :—*E.* Chinese Black-wood, Senaar Ebony.

CHAR. :—A small tree, 4·5-6 m. high. *Bark* white; branches more or less armed with stout spines. *L.*—10-18 cm. long, leaflets 9-15, thinly sub-coriaceous, small (the terminal the largest, obovate, cuneate, the lateral oblong), obtuse, emarginate, nearly glabrous. *Fl.*—numerous, in axillary panicles about equalling the leaves. Calyx pubescent, teeth ciliolate, the 2 upper obtuse, the 2 lateral smaller, linear oblong, obtuse, the lowest twice as long as the lateral, acute. Corolla yellow; standard oblong-obovate, emarginate. Stamens 9, monodelphous, the central stamen longer than the others. Ovary glabrous, style short. *Fr.*—pod, 2·5-6·3 cm. long, one-seeded.

DISTR. :—Very doubtfully wild in the Bombay State. The tree occurs in Kanara where it goes by the name of "Chinese Black-wood." It has been planted as a roadside tree in Dharwar and also at Ganeshkhind near Poona. Dalzell says it was raised in the Botanic Gardens at Hewra and Dapuri from seeds furnished by Mr. Nimmo and was called "Senaar Ebony" (T. Cook).

DESCR. OF WOOD :—Remarkably hard.

USES :—Used in Senegal and Gambia (W. Africa) for many of the purposes served by ebony.

DALBERGIA PANICULATA Roxb.

FAM.—Papilionaceæ.

COM. NS. :—*H.* Dhobein, Passi, Satpuria; *K.* Bilugatha, Hassurugunni, Kusrani, Pachari; *M.* Phansa, Sondarra, Shoedar.

CHAR. :—A large deciduous tree, 9-18 m. high ; girth 2.4-2.7 m. *Bark* compact, grey, smooth with many horizontal cracks. Young branches, petioles and inflorescence clothed with short, grey, silky pubescence. *L.*—13-15 cm., imparipinnate, turning black on drying. *Leaflets* 9-15, 2.5-5 × 2.5 cm., oval or obovate-oblong, emarginate or retuse, entire, sub-coriaceous, green above, glaucous beneath, on a petiolule. *Fl.*—white tinged with blue, numerous, small, sub-sessile, crowded on short racemes forming terminal and axillary panicles. Calyx densely silky. Corolla twice the length of the calyx, the limb of the standard broader than the base, keel shorter than the petals. Stamens 10, diadelphous. *Fr.*—legume, 4-10 × 1.3-2 cm., brown, narrowed at both ends, 1-2-seeded. *Fl. t.*—Mar.-May. *Fr. t.*—May-July. Sheds leaves Feb.-Mar. ; new leaves Apr.-May.

DISTR. :—In the deciduous forests of the Konkan and N. Kanara, common in the forests of Kalghatgi in Dharwar district and also on the Mawal district above the ghats. N. W. Himalayas from the Jumna to Oudh, Madhya Bharat and South India : Burma.

DESCR. OF WOOD :—*Colour* pale yellowish-white. Close-grained. The wood in concentric belts separated by narrow bands of soft tissue. *Pores* moderate-sized, scanty, often sub-divided. *Med. rays* fine, fairly numerous. Soft to moderately hard, very handsome. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for building and common purposes (Beddome). Rejected as fire-wood by the villagers in the Belgaum and Kanara districts (Talbot).

DALBERGIA SISSOO Roxb.

FAM.—Papilionaceæ.

COM. NS. :—*E. Sissoo* ; *G. Sisam*, Tanach ; *H. Shisham*, Sissu, Sissai ; *K. Biridi* ; *M. Shisavi* ; *Tr. Sissoo*.

CHAR. :—A handsome deciduous tree with an erect trunk about 8 m. high ; girth 1.8-3.6 m. *Bark* grey exfoliating in narrow longitudinal strips. Young parts and branches grey downy. *L.*—alternate, imparipinnate, on a zig-zag petiole. *Leaflets* 3-5, 2.5-3.5 cm. each way, orbicular, with a sudden long acumination, entire, firm, glabrescent. *Fl.*—yellowish-white, nearly sessile, in densely pubescent axillary panicles, much shorter than the leaves. Calyx campanulate, pubescent ; teeth very short ; 2 upper ones obtuse, 3 lower acute ; the central one the largest. Corolla twice the length of the calyx ; standard with a long claw. Stamens 9, monadelphous ; sheath open on the upper side. *Fr.*—legume, thin, linear-lanceolate, pale-brown, glabrous, with a stalk twice as long as the calyx, generally 2-3-seeded. Seeds compressed, reniform. *Fl. t.*—Mar.-June. *Fr. t.*—Nov.-Feb. Sheds leaves Dec.-Jan. New leaves Feb.-Mar.

DISTR. :—Planted throughout the State ; believed to be indigenous in Gujarat ; in river beds of sub-Himalayan tract from the Indus to Assam ; plains of Madhya Bharat : Baluchistan.

DESCR. OF WOOD :—*Colour*—sap-wood small, white ; heart-wood brown, with darker longitudinal veins. Close-grained. *An.*

rings not distinctly marked. *Pores* large and moderate-sized, scanty, in light-coloured irregular patches which are joined by fine, wavy, more or less concentric streaks, which are frequently interrupted and often very oblique, well-defined on a longitudinal section often filled, with resin. *Med. rays* pale, very fine, uniform, and equidistant, numerous. Very hard, remarkably strong; fairly durable; air-seasoned and kiln-seasoned without difficulty; does not warp or split; takes fine polish. Heart-centres are however a frequent cause of trouble; they often contain a white calcareous deposit; easy to saw and work. Sisoo is the main standby when best plywood is required quickly. *Wt.*—48 lbs. per c.ft.

USES :—Wood extensively used in boat-building, house-building, furniture, frames and parts of carts and carriages, ploughs, oil and sugar-mills, well-construction, bridge piles, tent-pegs, toys, interior panelling and furniture of railway carriages, sport goods, gymnastic materials such as Indian clubs, bars, etc. Used by Ordnance Department in connection with ammunition transport materials, etc. Finest of Indian cabinet and furniture woods. Leaves are a good fodder for cattle.

See—Fodder Plants.

DEBREGEASIA VELUTINA Gaud.

FAM.—Urticaceæ.

COM. NS. :—K. Kapsi, Kurgul.

CHAR. :—An evergreen tall erect shrub or small tree, 4·5-7·5 m. high; girth 3-45 m. *Bark* thin, greyish-brown, rough. Branches rough with warty excrescences and the scars of fallen leaves. *L.*—5-17·5 × 2·5 cm., lanceolate, oblong-lanceolate, acute or acuminate, sinuate, membranous, rough above, prominently reticulated and covered with a white or grey tomentum beneath, 3-nerved. *Fl.*—monœcious in heads or clusters on dichotomous, axillary, puberulous cymes, solitary or twin. *Fr.*—yellow when ripe, resembling a small raspberry. *Fl. t.*—Nov.-Jan. *Fr. t.*—Dec.-Feb.

DISTR. :—Common in evergreen forests of Konkan and N. Kanara; Sub-Tropical Himalayas from Kumaon to Sikkim. Alt. 900-1-800 m. Assam, Khasia Hills. Western Peninsula ascending to 2,100 m. in the Nilgiris: Ceylon.

DESCR. OF WOOD :—*Colour* reddish-brown. *Pores* moderate-sized, scanty. *An rings* marked by a line of colour pores. *Med. rays* moderately broad, uniform, the distance between them equal to or greater than the transverse diameter of the pores. Hard. *Wt.*—34 lbs. per c.ft. (Darjeeling).

USES :—Wood too small to be used for any economical purpose. Fibre from bark is sometimes used for making ropes and fishing nets.

See—Fibres.

DELONIX ELATA Gamble.

(POINCIANA ELATA Linn.)

FAM.—Cæsalpinaceæ.

COM. NS. :—G. Sidhsaro ; K. Niravgi ; M. Sankasur.

CHAR. :—An unarmed erect tree. *L.*—15-23 cm. long ; pinnæ 10-16 ; leaflets 30-40, caducous, sessile, obtuse. *Fl.*—yellowish, in corymbs, terminal or from the upper-axils. Calyx 2-2.5 cm. long. Petals 2.5 cm. broad, shortly-clawed, curled on the margin. Filaments bright-red, much exceeding petals, 5-7.5 cm. long, pubescent at the base. *Fr.*—legume, flat, 15-20 × 2.5-5 cm., 4-8-seeded. *Fl. t.*—rainy season. *Fr. t.*—cold season.

DISTR. :—Said to be indigenous in the forests on the western coast as far north as Gujarat. Cultivated in gardens and near villages throughout the State especially Deccan, Gujarat and Khandesh.

DESCR. OF WOOD :—*Colour* yellowish white, sometimes with irregular red heart-wood. Close-grained. *Pores* large, scanty, irregularly distributed, numerous light coloured bands of loose tissue alternate with darker bands of more compact texture. *Med. rays* short, fine, not numerous. Soft ; easily worked giving a smooth surface ; warping slightly but not subject to crack ; polishes well. *Wt.*—44 lbs. per c.ft.

USES :—Wood used for churns, bed-stead legs, combs and matches. Root, leaves and flowers are used in medicine (Jaikrishna Indrajī). The tree has been used in Madras to protect the footings of rivers and channel banks. (*Balfour* "Timber Trees").

DELONIX REGIA Raf.

(POINCIANA REGIA Bojer.)

FAM.—Cæsalpinaceæ.

COM. NS. :—E. Gold Mohur, May Flower ; M. Gulmohor.

CHAR. :—An almost evergreen handsome tree, 9-12 m. high, girth 9-1.2 m. *Bark* brown, slightly rough. Leaves bipinnate, 15-30 cm. long ; pinnæ 8-2 pair, leaflets in 15-20 pairs, nearly sessile, base oblique. *Fl.*—large, bright scarlet or crimson in axillary or terminal racemes. Petals wavy, 2 or 3 times larger than the calyx, tapering into claws, 2.5 cm. long, the upper petal more cuneate, variegated red and yellow. Stamens nearly as long as the petals, pubescent at the base. *Fr.*—pod, 3-7.5 m. × 5 cm., flat, sessile, glabrous, many-seeded. Seeds oblong, variegated brown and white. *Fl. t.*—Apr.-June. *Fr. t.*—cold season ; leafless for a short period during hot season.

DISTR. :—Native of Madagascar ; introduced into India about 125 years back ; now cultivated and naturalised all over India.

DESCR. OF WOOD :—*Colour* white. *Pores* large, often subdivided or in pairs, surrounded by patches of loose pale tissue, which are sometimes confluent. *Med. rays* fine to moderately broad,

rather scanty, showing as a silver grain on a radial section. Pores very prominent on vertical section. Soft and loose-grained; takes fine polish. Wt.—28 lbs. per c.ft.

USES :—No use is made of this wood.

DENDROCALAMUS GIGANTEUS Munro.

FAM.—Gramineæ.

COM. NS. :—The same as other bamboos.

CHAR. :—A gigantic bamboo; stem reaching 30 m. high with a diameter of 20-25 cm.; stem-sheaths very large, 50 cm. long and about as broad as the base; the imperfect blade 12·5-37·5 cm. long, reaching about 9 cm. broad. L.—up to 50 × 10 cm., cuspidately acuminate, ligule broad, fimbriate, sometimes cleft in the middle. Inflorescence a very large panicle with slender curved branches, Spikelets many flowered, ovate, acute, spiny.

DISTR. :—Grown in gardens in the State. Native of Malay Peninsula and Penang. Cultivated in Assam, Bengal, Malabar, Ceylon.

DESCR. :—Biggest of the Indian bamboos.

USES :—The culms make excellent pots for holding water and milk and are used for building.

DENDROCALAMUS STRICTUS Nees.

FAM.—Gramineæ.

COM. NS. :—*E.* Male Bamboo; *H.* Bans, Bans-kaban, Kopar; *K.* Kili-bidarn; *M.* Basa, Udha, Vasa.

CHAR. :—A deciduous densely tufted bamboo with strong stems, 6-15 m. high and 2·5-7·5 cm. diameter, which are solid or only with a small cavity, glaucous-green when young, dull-green or yellowish when old; nodes swollen, the lower often rooting, internodes 30-45 cm. long; upper branches decurved; stem sheath variable, 7-15-30 cm. long, covered on the back with golden-brown stiff hairs (or in dry localities sometimes glabrous), striate, rounded on the top, ciliate on the margins.

Grows rapidly; does not die after flowering, leafless during the cold season, renews leaves Apr.-May.

DISTR. :—Throughout the State and dry regions of India in deciduous forests. Konkan (planted), Deccan (rocky hills), Gujarat, Panchmahals. Gregarious over large areas in N. Kanara, S. M. Country, Sub-Himalayan tracts from the Indus eastwards up to 900 m. Burma, Java.

DESCR. OF WOOD :—Strong and elastic.

USES :—Used for all purposes of building, basket and mat-work, walking-sticks, *tattis*, lance-shafts, furniture, agricultural and industrial implements. Leaves are used for fodder. The dry culms and rhizomes used as fuel. Seeds are eaten as food grains in times of scarcity.

See—Fodder Plants, Famine Plants.

DICHAPETALUM GELONIOIDES End. and Hook. f.

FAM.—Dichapetalaceæ.

COM. NS. :—No common names.

CHAR. :—An evergreen shrub or a small tree. *Bark* thin, light yellowish-brown, with prominent rough lenticels in horizontal lines. *L.*—5-10 × 2-5 cm., while young silky pubescent beneath, alternate, elliptic or elliptic-lanceolate or obovate, abruptly acuminate, short-petioled. *Fl.*—numerous, small, on axillary cymes. Male flower—small. Sepals 5, obtuse, whitish. Petals long, narrow, abovate. Hypogynous glands 5, sub-quadrate, opposite to the petals. Anthers with broad connective. Female flower—as in the male, but the anthers sterile. Ovary broad, compressed, downy, 2-celled. Styles 2, very short, recurved. Stigma capitate. *Fr.*—capsule, oblong or oval, 2-lobed, compressed, 2-2.5 diam., covered with a grey down, dehiscing along the edges, showing inside yellowish-red arillus. Seeds oblong. *Fl. t.*—Mar.-June. *Fr. t.*—Aug.-Dec.

DISTR. :—W. Ghats from the Konkan southwards, abundant in the evergreen forests of N. Kanara near the Gairsappa falls. Forests of Madras, Eastern Bengal, at the foot of the Khasia Hills, Silhet, Chittagong, Ceylon (in the low country).

DESCR. OF WOOD :—*Colour* light yellowish-brown. *Pores* small, rather scanty. *An. rings* marked by the absence of pores in the spring wood. *Med. rays* variable, fine to broad, often short, several fine rays between the broad ones; silver-grain of whitish plates. Moderately hard.

The wood somewhat resembles that of the Oaks (Gamble).

USES :—Not known.

DILLENIA INDICA Linn.

FAM.—Dilleniaceæ.

COM. NS. :—*H.* Chalta; *K.* Kangala; *M.* Karambal, Motha Karmal; *Tr.* Dillenia.

CHAR. :—An evergreen tree, 9-15 m. high, girth 1-1.5 m., young shoots silky. *Bark* red, moderately thick, smooth, peeling off in small hard flakes. *L.*—approximated towards the ends of branches, acute, sharply serrate, almost coriaceous, glabrous above, pubescent beneath; petiole channelled. *Fl.*—solitary, about 13-15 cm. in diameter, pure white. Sepals orbicular, thick and fleshy. Petals obovate; carpels 20. *Fr.*—round, 7.5-13 cm. in diameter, hard outside, fleshy within. Seeds numerous, reniform, hairy along the edges. *Fl. t.*—June-July.

DISTR. :—Common in Konkan, South India; Bengal, Nepal, Assam, Burma, Ceylon, Malay; Archipelago.

DESCR. OF WOOD :—*Colour* reddish-brown or reddish-grey with occasional white chalky lines showing on the surface. *An. rings* faint. *Pores* moderate-sized, evenly distributed. *Med. rays* of two classes broad and very fine.

It is a rough constructional wood of good strength and hardness. It is close-grained and lasts well under water; has a slight tendency to split at the ends and to warp if twisted grain is present. Dries rapidly, careful stacking in shed results in good timber. Kiln-seasoning offers no difficulty. Takes a good polish without absorbing much polish. *Wt.*—39-43 lbs. per c.ft.

USES :—Wood used for house-building, knees and helms of boats, oars and gun-stocks. Specially selected quarter-sawn planks might find a market in cabinet and high-class furniture stores. Leaves used to polish ivory. Fleshy sepals have an agreeable acid taste, and are eaten raw or cooked; made into sherbet or a palatable jelly.

See—Food Plants.

DILLENIA PENTAGYNA Roxb.

FAM.—Dilleniaceæ.

COM. NS. :—*H.* Aggai; *K.* Kadkangala, Kanagalu, Machil, Modutega; *M.* Karmal, Karumbel Kari; *Tr.* Dillenia.

CHAR. :—A middle-sized deciduous tree. Height 18-21 m., girth 1.8-2.4 m. *Bark* grey or pale-brown, with shallow depressions caused by exfoliation. *L.*—silky pubescent when young, shining when old, oblong-lanceolate, 30-60 cm. \times 15-30 cm., narrowed into short winged petiole, denticulate with numerous parallel veins. *Fl.*—umbelled, 2.6 cm. in diameter, sweet scented, yellow. Petals obovate. Carpels and styles 5. *Fr.*—surrounded by enlarged fleshy sepals, globular, size of a cherry, smooth, orange yellow. *Fl. t.*—Apr.-May.

DISTR. :—Dangs, Konkan, S. M. Country and Kanara. In deciduous forests of both the Peninsulas; along the base of the Himalayas from Oudh and Bihar to Assam, Bengal, Burma; South India.

DESCR. OF WOOD :—*Colour* reddish-grey. *An. rings* marked by narrow belt in the outer edge without pores. *Pores* small, many of them filled with white substance (one of the characteristics of the wood). *Med. rays* of two classes, the larger moderately broad, with a few intermediate very fine rays. Silver grain good. Rough, moderately hard, fairly durable, apt to split, warp and crack. Dries rapidly and careful stacking in shed results in good timber; Kiln-seasoning offers no difficulty; takes a good polish, without absorbing much polish. *Wt.*—47.5 lbs. per c.ft.

USES :—Wood is but little used, occasionally only in construction, ship-building, and for rice mills and house posts. Used as firewood in N. Kanara. Leaves are used for thatching roofs of huts and also as fodder. Flower buds and young fruits have a pleasant acid taste and are eaten raw or cooked. Cordage is made from the bark.

See—Food Plants, Fodder Plants, Fibres.

DIMORPHOCALYX LAWIANUS Hook f.

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A small or moderate-sized tree. *L.*—7.5-18 \times 4.7-5 cm., elliptic-lanceolate, obtuse or obtusely acuminate, glabrous, dark-green

above, paler beneath, base acute. *Fl.*—dioecious; the males usually solitary on the old wood, shortly pedicellate; sepals 5 rounded, petals 5 oblong, obtuse; stamens 11 in two rows of 5 each and a terminal one; female solitary or 2 or 3 together on long pedicels; calyx divided to the base, sepals variable in size and shape, unequal. *Fr.*—capsule, 1.3 cm. in diameter, globose, hairy, 3-lobed. Seeds ellipsoid, yellowish mottled with brown. *Fl. t.*—Mar.-Oct. *Fr. t.*—Nov. Jan.

DISTR. :—In the evergreen forests of the Western Ghats from Konkan and N. Kanara to Travancore, Anamalai hills. Matheran, Khandala. Alt. up to 1,200 m.

DESCR. OF WOOD :—*Colour* white. Close-grained. *Pores* small, very scanty. *Med. rays* extremely fine, numerous. Numerous very fine pale bars in the tissue between the rays. *Hard.* *Wt.*—59 lbs. per c.ft. (Travancore).

USES :—Not known.

DIOSPYROS CANDOLLEANA Wight.

FAM.—Ebenaceæ.

COM. NS. :—K. Kari-gidde; M. Kalwan.

CHAR. :—A large shrub or a small tree, about 10 m. high, young shoots pubescent. *L.*—10-15 × 2.5-5 cm., elliptic-oblong, obtusely acuminate, very coriaceous, veinless, rather shining. *Fl.*—axillary, aggregate, sessile; calyx and corolla 4-5 cleft; calyx densely rusty-pubescent. Male flowers—very numerous, stamens 10, filaments united by pairs at the base, anthers apiculate. Female flowers—calyx segments revolute at the margins, staminodes 4-5, single; ovary 4-celled; style simple; stigma 2-lobed. *Fr.*—ovoid, hard, size of a nutmeg. *Fl. t.*—Apr.-July. *Fr. t.*—ripe in Nov.-Dec.

DISTR. :—Western Ghats from the Konkan to Quilon. Throughout the Konkan and N. Kanara, in evergreen forests, common near the coast of Karwar.

DESCR. OF WOOD :—*Colour* red (Gamble), olive-green or yellowish (Talbot). No heart-wood. *Pores* small to moderate-sized, scanty, often sub-divided, equally distributed. *Med. rays* fine, very numerous. Transverse bars fairly prominent, combining into wavy concentric lines. *Hard* (Gamble), soft (Talbot), light, smooth. *Wt.*—about 40 lbs. per c.ft.

USES :—Not known.

DIOSPYROS CHLOROXYLON Roxb.

FAM.—Ebenaceæ.

COM. NS. :—G. Nensi; M. Ninai.

CHAR. :—A small tree, sometimes spinescent. *Bark* dark-brown, nearly black, cleft longitudinally and peeling off in small rectangular corky scales. *L.*—2.5-5 × 2.3-2 cm., alternate, elliptic-oblong or obovate-oblong, pubescent above, rusty-tomentose beneath, on

petioles 3-4 lin. *Fl.*—white, tetramerous; male in axillary fascicles of 6-10 minute flowers, stamens 16 in 2 series, the inner smaller; female flowers solitary, sessile, small, with about 8 stamens, styles 4, bi-fid, ovary 8-celled. *Fr.*—globose, size of a cherry, purplish when ripe. 2-3-seeded by abortion, edible, albumen uniform. *Fl. t.*—June. *Fr. t.*—Jan.-Feb.

DISTR. :—Deccan Peninsula to Orissa, common about Surat in Gujarat and in Nasik District; South India.

DESCR. OF WOOD :—*Colour* yellowish-grey. *Pores* small to moderate-sized, single or sub-divided, or in radial strings of 1 to 4 or more, scanty. *Med. rays* fine, numerous, Transverse lines faint, irregular. Moderately hard, durable. *Wt.*—46 lbs. per c.ft. (one specimen).

USES :—Wood used for ploughs, combs, tool-handles; yields good fuel. Ripe fruit is eaten and is very palatable.

See—Fruit Trees.

DIOSPYROS CRUMENATA Thw.

FAM.—Ebenaceæ.

COM. NS. :—K. Kan Tumri.

CHAR. :—A very large tree, with cylindric trunk, 30-45 m. high; 1.2-1.5 m. diam. at the base. *Bark* thin, scaly, cinerous. *L.*—coriaceous, 5-12.5 × 2.5-5 cm., elliptic oblong, abruptly acuminate, glabrous, base nearly rounded. *Petiole* channelled above. *Male fl.*—in short 3-5-flowered, hairy cymes. *Calyx* tubular, hairy outside, glabrous, and shining inside; teeth very short, acute. *Corolla* cream-white, tubular, coriaceous, hairy outside, lobes 4, recurved. *Stamens* about 12, sub-equal. *Female fl.*—solitary, larger than the male, calyx hairy on both sides, plicate; lobes 4, broad, with large and deep pouches between them. *Corolla* like male but a little longer. *Staminodes* 8 inserted at the base of the corolla-tube. *Ovary* hairy, 8-celled, stigmas 4. *Fr.*—4-5 cm. in diam, sub-globose; fruiting calyx thickened, spreading. *Seeds* black, shining; albumen ruminate. *Fl. t.*—Mar.-May. *Fr. t.*—hot season.

DISTR. :—Common in N. Kanara in the evergreen forests between the Gairsappa and Dodamanc ghats; Ceylon.

DESCR. OF WOOD :—*Colour* reddish-brown. Close-grained. *Pores* very scanty, moderate-sized, single or sub-divided, or in strings of 1 to 4. The patches obliquely arranged. *Med. rays* very fine, very numerous. No ebony heart-wood even in the largest trees. Hard. *Wt.*—54 lbs. per c.ft.

USES :—Not known.

DIOSPYROS EBENUM Koenig.

FAM.—Ebenaceæ.

COM. NS. :—E. Ebony; H. Abnus, Ebans, Tendu; K. Karc; M. Abnus, Malia, Tai, Tendu,

CHAR. :—A large or moderate-sized tree, trunk erect, head leafy. *Bark* very thin, darkish-grey, rather smooth or rough, lenticular, cinerous. *L.*—5.15 × 2.6.3 cm., glabrous, elliptic-oblong or oblong-lanceolate, bright-green and shining above, paler beneath. *Male fl.*—3-12 (very often 3) together, in shortly peduncled cymes; buds linear, tapering. Calyx infundibuliform, lobes 4, ciliate. Corolla pale greenish-yellow, tubular; lobes 4, ovate; stamens 16 or more, very unequal, often connate, in twos, threes or fours. *Female fl.*—solitary, larger than the male; calyx much longer than in male, deeply divided, with an elevated 4-lobed marginal ring at its mouth; lobes 4; staminodes 8; style one; stigmas 5. *Fr.*—2 cm. in diam.; sub-globose; fruiting calyx a woody cup with calyx lobes spreading outwards. Seeds 3-8, dull-black; albumen not ruminate. *Fl. t.*—Feb.-Mar. *Fr. t.*—hot season.

DISTR. :—Deccan and Karnatic, in dry evergreen forests; S. M. Country. Western Peninsula, Ceylon, Malaya.

DESCR. OF WOOD :—*Colour*—sap-wood grey, often streaked with black; heart-wood, jet-black. Close and even-grained. *Pores* small, scanty, in short radial lines. *Med. rays* very fine, numerous, equidistant. Transverse bars very fine, indistinct. Very hard. *Wt.*—74 lbs. per c.ft. is a fair average for only heart-wood (Gamble).

USES :—Tree yields ebony used for wood-carving in Kumta and Honavar. The quality is good but large pieces are rare.

This, the chief ebony yielding tree, and the only one giving a black wood without other streaks or markings, is very little cut and exported, not being very common and found only here and there and of small size. In Ceylon this is one of the chief woods.

DIOSPYROS EMBRYOPTERIS Pers.

FAM.—Ebenaceæ.

COM. NS. :—*E. Riber* Ebony, Wild Mangosteen; *G. Zeeberwo*; *H. Gale*, Kala-tendu, Makurkendi, Tendu; *K. Banda*, Gavandu, Tumari, Tumaki-mara; *M. Temburni*, Timbwini; *Tr. Ebony*.

CHAR. :—A small evergreen tree, branches forming a dense shady head, 9-10.5 m. high, girth about 1.2 m. *Bark* smooth, dark-grey, almost black, with a greenish tinge. Leaf bud silky with adpressed hairs. *L.*—13-20 × 5 cm., alternate, short-petioled, coriaceous, smooth, shining, linear-oblong on thick wrinkled petioles. *Fl.*—white, fragrant, tetramerous; male peduncles axillary, length of petiole drooping, 3-6 flowered, furnished with a small deciduous bract, anthers 40 on 20 filaments; female axillary, solitary, larger than the male, on short recurved pedicel. Staminodes 1-4. Ovary globular, hairy, 8-12-celled. Styles 4-6. Stigma branched, usually 2-3 fid. *Fr.*—4-5 cm. diam., globular, rusty-yellow when ripe, covered with a rusty, meal-like tomentum. Seeds usually 5-8, immersed in viscid glutinous pulp, reniform. *Fl. t.*—Mar.-May. *Fr. t.*—cold season.

DISTR. :—Near creeks and back-waters, along the coast of N. Kanara, and the Konkan; in the rain forests and river-beds in the

ghats. Throughout India from the Himalayas to Ceylon. Common in Bengal, Siam, Malay Archipelago.

DESCR. OF WOOD :—*Colour* grey with darker streaks and a darker irregular patch in the centre (heart-wood?). *Close-grained*. *Pores* small, scanty, sub-divided or in short radial lines. *Med. rays* very fine, very numerous. Transverse bars very faint or wanting. Moderately hard; takes a good polish. *Wt.*—45 lbs. per c.ft.

USES :—Wood is sometimes used for building purposes, well-construction; in Ceylon used for masts and yards of small shipping vessels. Wood, bark, flowers, fruits and seeds are used medicinally. The fruit has a strongly astringent taste, due to the presence of tannin, and an infusion of it is used for steeping fishing nets and lines to strengthen and preserve them; also used for dyeing and tanning. The viscid fruit pulp is used as a gum in book-binding, and in place of tar for paving the seams of fishing boats. Young leaves and fruits are fed to cattle.

See—Medicinal Plants, Dyes and Tans, Fodder Plants.

DIOSPYROS MELANOXYLON Roxb.

FAM.—Ebenaceæ.

COM. NS. :—*E.* Coromandel Ebony; *G.* Tamruj; *H.* Tendu; *K.* Balai, Thumbri; *M.* Temru, Tendu; *Tr.* Ebony.

CHAR. :—A middle-sized deciduous tree, 9-15 m. high; girth about 1.8 m. *Bark* dark-grey or black, cleft into small rectangular plates, showing the black inner bark in the clefts; the bark shows alternate layers of brown and black. All the young parts and inflorescence covered with grey or tawny tomentum. *L.*—alternate or sub-opposite, 7.5-15 × 4.5 cm., sometimes longer, coriaceous, oval, or elliptic, narrowed at both ends, when full grown glabrous above, tomentose or pubescent beneath. *Fl.*—white. Male peduncles very short, 3-12-flowered, axillary or extra-axillary; bracts, calyx and corolla densely tomentose; stamens 12-16, inserted on the torus. Female solitary, axillary or extra-axillary, usually twice larger than the male, on short pedicels. Calyx-lobes 4-5. Corolla-lobes 4-5. Staminodes 8-10 or less. Styles 2 or 3, bi-fid. Ovary round, hairy, 4-8-celled. *Fr.*—globose, yellowish when ripe, 2.5-4 cm. across, 4-8 seeded. *Fl. t.*—Feb.-Apr. (T. Cooke). Apr.-May (Talbot). *Fr. t.*—during the rains. Sheds leaves in cold season; new leaves in Apr.

DISTR. :—Common in the dry deciduous forests of the State; Konkan, S. M. Country. N. Kanara; Madhya Pradesh, Chota Nagpur, Bihar, South India; Ceylon.

DESCR. OF WOOD :—*Colour* reddish-brown, with an irregular black heart-wood. *Pores* small, very scanty, single or in radial lines of 2 or 3 together, the lines often in echelon. *Med. rays* fine, numerous, transverse bars very fine, very faint, wavy, roughly joining into concentric lines; sap-wood of commercial value, with great strength, toughness and shock-resisting ability. Hard, heavy, quite durable; difficult to season; prone to split and develop fine surface

cracks; easy to saw or work; takes a good polish. *Wt.*—75 lbs. per. c.ft.

USES :—Wood used for buildings, shoulder-poles, carts and carriage shafts, spokes, furniture, rice-pestles, walking-sticks, combs, toys, carving and fancy articles in general, also used as a decorative flooring in the form of small blocks. Fruit edible when quite ripe; it contains yellowish, sweet, soft and highly astringent pulp, much appreciated during the hot season. Leaves serve as plates in Khandesh and Kanara districts. Young leaves and fruits are eaten by cattle.

See—Fruit Trees, Fodder Plants.

DIOSPYROS MICROPHYLLA Bedd.

FAM.—Ebenaceæ.

COM. NS. :—K. Dula, Kare-Kunchal.

CHAR. :—A large tree, 24-30 m. high; diam. 0·9 m., trunk straight, unbranched for a considerable height, buttressed at the base. *Bark* dark, scaly (Talbot), white (Gamble); inner bark red, fibrous, soft; young branches verticillate, hirsute with long yellowish hairs, older branches glabrous. *L.*—2·5 × 1·3-2·2 cm., coriaceous, ovate-elliptic, acute or obtusely acuminate. *Male fl.*—small, 4-merous, 1-4 together in axillary cymes. Calyx densely hairy; lobes 4, rounded. Corolla 4-cleft; lobes rounded with a line of hairs at the back. Stamens 16, united in pairs. *Female fl.*—solitary, calyx and corolla as in the male, staminodes 0; style short 2-partite. *Fr.*—small, cylindric or oblong, pointed, glabrous. Seed 1; albumen not ruminant. *Fl. t.*—hot season. *Fr. t.*—cold season.

DISTR. :—In the evergreen forests of N. Kanara; Western Ghats from Kanara to Mysore and Anamalai hills: Malacca, Penang, Singapore, Java, Borneo.

DESCR. OF WOOD :—*Colour* dark-grey or reddish-grey. *Pores* large, scanty, often sub-divided, obliquely arranged. *Med. rays* very fine, regular, numerous, transverse bars narrow, very close and frequent, concentric. Moderately hard, smooth; quickly decays on exposure. *Wt.*—46 lbs. c.ft.

USES :—Timber not used in N. Kanara.

DIOSPYROS MONTANA Roxb.

FAM.—Ebenaceæ.

COM. NS. :—H. Bistend, Dasaundu, Lohari, Tendu; K. Balkuniki, Goindu, Jagalagante; M. Temburni, Timru.

CHAR. :—A small or middle-sized deciduous tree; 6-9 m. high, (sometimes more in higher situations), girth 0·9-1·5 m., often armed, spines branched or simple. Young branches softly pubescent. *Bark* thin, grey or greyish-black, rough, when old exfoliating in scales. *L.*—variable in size and shape; 2·5-15 cm. long, always alternate, ovate-oblong, linear-oblong, elliptic or obovate-oblong, obtuse, more or less acute or acuminate at the apex, rounded or cordate at the base, on a slender petiole. *Fl.*—greenish-white, small,

4-merous; male flowers 2-6, sometimes more, in short, pedunculate, recurved axillary cymes, stamens 16; female flowers solitary, axillary, larger than the male on recurved pedicels 3-5 lin. long, staminodes 4-12, ovary 8-celled. *Fr.*—globular, 1.3-4 cm. diam., 2-8-seeded, yellowish when ripe, smooth, bitter, not edible. *Fl. t.*—Feb.-Apr. *Fr. t.*—ripe in rainy season.

DISTR. :—Throughout the deciduous forests of the State; common on the N. Kanara ghats; throughout India: Ceylon, Malaya, tropical Australia.

DESCR. OF WOOD :—*Colour* grey, often tinged with yellow or brown, streaked with narrow patches of darker colour, especially towards the centre but no regular ebony heart-wood. *Pores* small, in short radial groups of 1 to 4; these groups distant and faintly echeloned. *Med. rays* fine, short, numerous. Transverse lines very faint. Soft to moderately hard; durable. *Wt.*—47 lbs. per c.ft. (Gamble); 54 lbs. per c.ft. (Talbot).

USES :—Wood used for house-posts, suitable for furniture. "Beautiful furniture wood, but tree rarely grows to a size to give timber" (Brandis). "Natives in Mysore have a superstition that if the wood is used in house-building, there will be quarrels amongst the inmates" (Graham Anderson).

DIOSPYROS OOCARPA Thw.

FAM.—Ebenaceæ.

COM. NS. :—No common names.

CHAR. :—A small or moderate-sized tree. *Bark* dark-coloured, thin, smooth; young shoots pubescent. *L.*—alternate 7.5-11.3 × 4.5-6 cm., ovate-elliptic, obtusely acuminate, glabrous, shining, base rounded, petiole flattened, rugulose. *Male fl.*—3-7 together in axillary silky cymes; bracts silky hairy. *Calyx* cylindric, silky. *Corolla* thick, hairy, lobes 3-4 equalling the tube, ovate-oblong. *Stamens* 9-12, unequal. *Female fl.*—1-3 together, similar to and slightly larger than the male. *Fr.*—2-2.5 cm. long, cylindric when young, ellipsoid when ripe, 6-celled, seated on funnel-shaped persistent calyx. *Fl. t.*—Jan.-Mar. *Fr. t.*—ripe in June.

DISTR. :—In the evergreen forests of N. Kanara and the Konkan, Mysore, Ceylon.

DESCR. OF WOOD :—*Colour* greyish-brown with irregular purplish-black heart-wood, here and there with paler streaks. *Pores* moderate-sized to large, very scanty, sometimes sub-divided. *Med. rays* very fine, numerous, not clear. Transverse bars very faint. Moderately hard. *Wt.*—45 lbs. per c.ft. (Gamble).

USES :—Wood used for ornamental cabinet-work.

DIOSPYROS PANICULATA Dalz.

FAM.—Ebenaceæ.

COM. NS. :—K. Kuri-koomar.

CHAR. :—A middle-sized tree with cylindric tall stem, branches glabrous, somewhat angular. *Bark* smooth, dark-coloured, inner

bark hard, reddish-brown. *L.*—13-23 × 4-7 cm., lanceolate-oblong, obtusely acuminate, very coriaceous, veins closely reticulated. *Male fl.*—numerous on velvety axillary cymes, about 1/3 the length of the leaves; bracts large, ovate, obtuse, deciduous; calyx 5-divided, ventricose; segments oblong; obtuse; as long as the tube; stamens 20 in pairs sub-equal. *Female fl.*—solitary, extra-axillary; peduncles 2-3 times the length of the petiole, with 2 large ovate bracts about the middle; calyx accrescent with the fruit, glabrescent. *Fr.*—ovoid, densely tomentose, 3-4 celled, supported by the enlarged calyx. *Fl. t.*—Nov.-Dec. *Fr. t.*—Apr.-June.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, frequent in the forests near Nilkund and Gairsappa ghats. S. M. Country, Chorla ghat; Western Peninsula.

DESCR. OF WOOD :—*Colour* white, with iron-grey heart-wood, streaked with darker lines. *Pores* scanty, moderate-sized or large, faintly obliquely echeloned. *Med. rays* very fine, very numerous, wavy. *Soft.* *Wt.*—40 lbs. per c.ft.

USES :—Wood occasionally used for house-building.

DIOSPYROS SYLVATICA Roxb.

FAM.—Ebenaceæ.

COM. NS. :—K. Kaka Suroli, Kurnal.

CHAR. :—A middle-sized tree reaching 18 m. high; about 45 cm. in diam. (Talbot). *Bark* dark coloured with white patches, thin, smooth, except a few lenticels, the inner bark yellow. *L.*—alternate, 7.5-12.5 × 2.5-6.3 cm., elliptic, acute or acuminate, membranous, shining above, pale beneath. *Male fl.*—3-5 (usually 4)-merous, in axillary 6-10-flowered cymes; calyx very small, pubescent; lobes short, rounded, corolla urceolate, lobes equalling the tube. *Female fl.*—larger than male 3-4 (usually 4)-merous, solitary; calyx much longer than in the male; lobes ovate-oblong, acute; staminodes 4 inserted on the corolla and alternate with the lobes; ovary 6-8 celled, styles 3-4. *Fr.*—1.3-2 cm. in diam., globose, smooth, dark-green, fruiting calyx much enlarged, flat, spreading. *Seeds* 2-8, rugose, shining brown; albumen ruminate. *Fl. t.*—Jan.-Feb. *Fr. t.*—ripe Sept.-Oct.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, common in the forests of Yellapur and Siddapur sub-division; Western Ghats from Bombay to Ceylon ascending to 900 m.

DESCR. OF WOOD :—*Colour* grey with black streaks and irregular black patches in the centre, hardly true heart-wood. *Pores* scanty, grouped in short radial lines, the groups distant and somewhat echeloned. *Med. rays* fine, numerous, regular, well-marked. Transverse bars clear, fine, regular, wavy, in concentric lines. Moderately hard. *Wt.*—50 lbs. per c.ft. (Gamble).

USES :—Not known.

DOLICHANDRONE CRISPA Seem.

FAM.—Bignoniaceæ.

COM. NS. :—K. Gudmurji, Mushwal, Nulda, Udedu.

CHAR. :—A deciduous tree, 10·5-18 m. high, young parts velvety pubescent. *Bark* 2 cm. thick, brown, rough. *L.*—15-30 cm., opposite-pinnate, leaflets 5-7, rarely 3, 5-10 cm. long, oblong, acute, entire on petioles 2·5-5 cm. long. *Fl.*—large, white, long-pedicelled, fragrant, in terminal, few-flowered racemes. Calyx 2·3 cm. long, spathaceous, opening on the upper side. Corolla 6·3 cm. long, lobes with curled edges. *Fr.*—capsule, 30-33 × 1·3 cm., pendulous, variously curved, hard and brown. *Fl. t.*—Apr.-Sept. *Fr. t.*—ripe next rainy season.

DISTR. :—In the dry deciduous forests of the Deccan and the Karnatak. Common in the Kaputgudda range in the Dharwar district; also in the Belgaum district at Sutgattee, Madras and elsewhere.

DESCR. OF WOOD :—*Colour* light yellowish-brown. *Even-grained.* *Pores* moderate-sized, often sub-divided, scanty, surrounded by light rings and arranged in concentric lines, where they are joined by fine lines of loose tissue. *Med. rays* fine, numerous, wavy. Moderately hard, rather heavy, durable. *Wt.*—about 44 lbs. per c.ft.

USES :—Wood used for buildings and other purposes.

DOLICHANDRONE FALCATA Seem., Var. LAWII Haines.

FAM.—Bignoniaceæ.

COM. NS. :—K. Gudmurki, Vudeedu, Wudige; M. Medsingi.

CHAR. :—A middle-sized deciduous tree, 6-15 m. high, young parts pubescent. *Bark* thin, bluish-grey, exfoliating in irregular woody scales. *L.*—7·5-15 cm., usually opposite, unequally pinnate, 2-3 pairs; leaflets 2-3 pairs, 1·3-4 cm. and nearly as much across, orbicular, obtuse or short-acuminate, short-petioled. *Fl.*—4 cm. long, white, fragrant, in few-flowered terminal racemes. Corolla deeply cleft into 5 unequal lobes. *Fr.*—capsule, linear, flat, variously curved, 25-35 × 7·5-10 cm. Seeds with oblong wings. *Fl. t.*—Mar.-May. *Fr. t.*—cold season.

DISTR. :—Throughout the Konkan and N. Kanara in dry deciduous forests. Deccan Peninsula, Mysore, Madhya Pradesh, Rajasthan. Found often in rocky places.

DESCR. OF WOOD :—*Colour* whitish. No heart-wood. Close and even-grained; shining and glossy. *An. rings* indistinct. *Pores* small, oval and sub-divided, arranged in wavy, narrow, concentric bands. *Med. rays* very fine, very numerous. Hard, strong, durable, seasons well. *Wt.*—43 lbs. per c.ft.

USES :—Wood used for buildings and agricultural implements. Young leaves are eaten by cattle.

See—Fodder Plants.

DOLICHANDRONE STIPULATA Benth.

FAM.—Bignoniaceæ.

COM. NS. :—No common names.

CHAR. :—A moderate-sized deciduous tree, 9-12 m. high. *L.*—2·5-4 cm. long; leaflets 3-5 pairs and an odd one. *Fl.*—corolla yellowish-brown outside, purple inside, 5-7·5 cm. long. *Fr.*—capsule, woolly, tomentose.

DISTR. :—Planted in old botanical gardens at Hewara (near Junnar) and Dapuri (near Kirkee), Poona district. A native of Rangoon and Pegu.

DESCR. OF WOOD :—*Colour* orange-red, beautifully mottled, close-grained. *Pores* small, enclosed in round patches of soft tissue which are often arranged in wavy, concentric lines in one direction, and in short slanting lines in another. *Med. rays* prominent, very fine, very numerous, generally filled with a yellow substance. Hard, durable. *Wt.*—58 lbs. per c.ft. (Burma), 54 lbs. per c.ft. (Andamans).

USES :—Wood is used for bows, spear-handles, oars, paddles. Durable wood for house-posts and makes good furniture (Major Ford).

DRYPETES VENUSTA Pax. and K. Hoff.

(HEMICYCLIA VENSUTA Thw.)

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A middle-sized evergreen tree about 18 m. high, 3-1·5 m. in diameter, branchlets slender, drooping. *Bark* smooth, *L.*—thickly coriaceous, 9-14 × 2·5-5 cm., elliptic or oblong, obtuse or acuminate, base acute, sometimes unequal-sided. *Fl.*—axillary, the males in fascicles, the females usually solitary. *Male flowers*—sepals 4, broadly ovate, stamens 5-8 surrounding a fleshy disk. *Female flowers*—sepals as in the males, ovary on fleshy disk. *Fr.*—obovoid, 2-1·3 cm. *Fl. t.*—Nov. *Fr. t.*—Jan.-Feb.

DISTR. :—Western Peninsula from Kanara to the Nilgiris and South Tirunelveli ascending to 1,200 m. Common on the southern ghats of N. Kanara in evergreen forests. Konkan, S. M. Country, Dharwar.

DESCR. OF WOOD :—*Colour* dark-grey. Close-grained. *Pores* small, often sub-divided, or in radial strings. *Med. rays* fine, very numerous. Alternate bands of light and dark tissue. Very hard; splits in seasoning. *Wt.*—51 lbs. per c.ft.

USES :—Can be used like *Dolichandrone stipulata* Benth.

DYSOXYLUM BINECTARIFERUM Hook. f.

FAM.—Meliaceæ.

COM. NS. :—*K.* Kadu-gaddha ; *M.* Devdaru, Yerindi ; *Tr.* White cedar.

CHAR. :—A large evergreen tree, 9-15 (sometimes 18) m. high. *L.*—23·4–46·8 cm. long ; petioles flat. Leaflets 5-9, 6·5-17 × 2·6-8 cm., alternate, ovate-lanceolate to elliptic-lanceolate, acuminate, unequal at the base, entire, glabrous. *Fl.*—4-nerous, pale-green or greenish-yellow, shortly pedicelled, in minutely puberulous panicles. Calyx thick, coriaceous, hemispherical, obsoletely 4-toothed. Petals coriaceous ; staminal tube cylindric, toothed. Ovary and style hairy. *Fr.*—capsule, 6·5 cm. diam., brownish-yellow, pear-shaped, size of an apple, 4-celled, 4-seeded, each cell containing a solitary, dark-purple, obovate-oblong, chestnut-sized seed. *Fl. t.*—rainy season. *Fr. t.*—cold season.

DISTR. :—Common in the evergreen forests of N. Kanara near Gairsappa falls ; near Amboli in Belgaum dist. ; W. Peninsula from the Konkan southwards—Khandala to Mysore ; Khasia mountains, Assam ; Ceylon.

DESCR. OF WOOD :—*Colour*—red or reddish-grey. Close-grained. *Pores* large and moderate-sized, often sub-divided. *Med. rays* moderately broad, red, wavy, irregularly distributed ; distance between the rays generally larger than the transverse diameter of the pores, but occasionally less when they are bent round them. Fine-textured wood of good class. Rough, moderately heavy, as hard as and stronger than teak, considerably durable, seasons well without much difficulty, saws and works with ease to a fine finish and presents no difficulties in the workshop. *Wt.*—44 lbs. per c.ft. Wood is worthy of notice.

USES :—Wood used for dug-out canoes and oars ; board-making, furniture, house-construction and waggon-work ; suitable for cigar-boxes.

DYSOXYLUM MALABARICUM Bedd.

FAM.—Meliaceæ.

COM. NS. :—*E.* White cedar ; *K.* Bili-budlige, Bili-devadari.

CHAR. :—A very large tree, stem cylindrical ; young shoots slightly puberulous. *Bark* light-coloured, exfoliating in large scales, mostly breaking off from below. *L.*—up to 48 cm. long, abruptly pinnate ; rachis angular ; leaflets alternate or sub-opposite, 4-5 pairs, 10-23 cm. long, pale green, elliptic-oblong, acuminate, entire, puberulous when young ; lateral nerves 15-20 pairs, prominent beneath. *Fl.*—small, in axillary racemose panicles shorter than the leaves ; buds oblong. Calyx short, finely pubescent outside, 4-lobed ; lobes ovate, acute. Petals 4, linear-oblong, sub-acute, imbricate. Staminal tube urceolate, with 8-deep emarginate crenatures, contracted about 2/5 of the way up ; anthers alternate with the crenatures, included. Disk cupular, truncate, subentire or irregularly toothed ; ovary densely pubescent, tapering into a style, 4-celled ; stigma capitate, 4-lobed. *Fr.*—5 cm.

in diam., pyriform, verrucose, bright yellow when ripe, 3-4 seeded. *Fl. t.*—Jan.-Feb. *Fr. t.*—May-June.

DISTR. :—Evergreen forests of N. Kanara. Common near Yellapur ; Western Peninsula.

DESCR. OF WOOD :—*Colour* light-red. Close-grained. *Pores* moderate-sized, numerous, evenly distributed, sometimes in fine concentric white lines, sometimes alone. *An. rings* distinct. *Med. rays* fine, numerous. Moderately hard, elastic, smells strongly like cedar when freshly cut, polishes well with a fine satin lustre. Logs decay rather slowly on exposure. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for building purposes in N. Kanara but not in great demand. Suitable for railway carriage construction, cigar-boxes, tea-cases, etc.

EHRETIA LAEVIS Roxb.

FAM.—Boraginaceæ.

COM. NS. :—*H.* Chamror, Darar, Datranga, Koda ; *K.* Adakbagari, Kappura, Karatuke ; *M.* Datranga.

CHAR. :—A moderate-sized deciduous glabrous tree ; 9-15 m. high, girth .9-1.2 m. *Bark* rather thick, grey, smooth and scaly ; inner bark soft, white and without fibres. *L.*—7.5-12.5 × 5 cm. very variable, often ovate or elliptic, acutely acuminate or obtuse, rounded or acute at the base, coriaceous, entire. *Fl.*—small, white, sessile, in terminal and axillary compound cymes. Calyx segments small. Corolla-lobes spreading. Anthers exserted. *Fr.*—drupe, red, afterwards black, size of a pepper kernel, rugose, with 4-seeded pyrenes. *Fl. t.*—Jan.-Mar., sometimes later. *Fr. t.*—Apr.-June ; sheds leaves in cold season ; new leaves Feb.-Mar.

Var. canarensis C. B. Clarke in Hook f. [F. B. I. V. 4 (1883), p.142] which is described as having broadly oblong, symmetric, strongly nerved leaves narrowed at both ends, cannot in my opinion, be maintained as a good variety. I have found on the same specimen both symmetric and unsymmetric leaves, so that the chief distinguishing character is not a constant one (T. Cooke).

DISTR. :—Throughout the State in deciduous forests ; the so-called *var. canarensis* is common in the Konkan and N. Kanara in the ghat forests. Throughout tropical and sub-tropical India.

DESCR. OF WOOD :—*Colour* greyish, or brownish-white. Even-grained. *An. rings* indistinctly marked. *Pores* small, grouped in small clusters or radial lines. *Med. rays* fine, short, numerous, distinctly visible on a radial section. Moderately hard, tough, durable. *Wt.*—35 lbs. per c.ft.

USES :—Wood used for buildings and agricultural implements. Good but somewhat hard for matches and inside match-boxes (Troupe). Used for fuel. The inner bark is said to be eaten, mixed with flour in times of famine. Fruit is also eaten though insipid. Leaves are used as fodder.

See—Fodder Plants, Famine Plants.

ELÆOCARPUS MUNROII Mast.

FAM.—Elæocarpaceæ.

COM. NS.:—No common names.

CHAR.:—A large magnificent tree, 18-24 m. high. *L.*—towards the ends of branchlets, 7.8×5.2 cm., ovate-lanceolate, acuminate, slightly serrulate, without glands on the under surface, glabrous. Petioles 5.2 cm. *Fl.*— $1/2$ in. diam., pure white, on slender, drooping, about 2 cm. pedicels, in many-flowered racemes, nearly as long as the leaves. Sepals 5, lanceolate, acute. Petals 5, deeply laciniate. Stamens numerous, glabrous. Anthers linear, longer than the filaments, terminated by a long awn. Ovary ovate, villous, 2-celled, on a raised torus. Style longer than the stamens; stigma simple. *Fr.*—drupe, oblong, yellowish, shining, size of an olive. Nut 1-celled, coarsely and irregularly tubercled. Seeds solitary, oblong. *Fl. t.*—cold season. *Fr. t.*—Feb.-Mar. When covered with flowers, is a sight to look at.

DISTR.:—In the Southern Konkan in the Bombay State. Evergreen forests of the Western Ghats from Konkan southwards (Brandis); Coorg, Nilgiris and other parts of Madras State.

DESCR. OF WOOD:—Colour white. Pores moderate-sized, scanty. Med. rays fine, very numerous. Moderately hard.

USES:—Ripe fruits are eaten; unripe ones are pickled.

ELÆOCARPUS OBLONGUS Gaertn.

FAM.—Elæocarpaceæ.

COM. NS.:—*E.* Wild olive of Malabar; *M.* Khas, Kasoo, Gurmoole, Wowuli.

CHAR.:—A handsome middle-sized tree, sometimes growing to a large size. *L.*— $7.8-10.4 \times 4.6-5.2$ cm., alternate, elliptic, or elliptic-oblong, acute or acuminate at the apex, somewhat cuncate at the base, serrate, with blunt serratures, glabrous, thick, dark-green, shining. Petiole with a small gland on each side near the apex. *Fl.*—white, 2 cm. diam., glabrous, faintly fragrant, on slender pedicels, in simple racemes from the axils of fallen leaves, and shorter than the latter. Sepals 5, lanceolate, brownish-red. Petals 5, deeply laciniate, longer than the sepals. Stamens 30-40; filaments very short. Anther-valves naked or bearded. Ovary sessile, 3-celled. Style longer than the stamens; stigma simple. *Fr.*—drupe, 2-3 cm. long, oblong, purple, indehiscent. Nut oblong, 1-celled, 1-seeded, hard, indehiscent, prominently tubercled. *Fl. t.*—May-June. *Fr. t.*—rainy season. "When in full bloom this is certainly a most beautiful tree."

DISTR.:—In the forests from Mahabaleshwar to Konkan; common at Mahabaleshwar in the valley of the Yenna and at Lingamala. Mysore, Nilgiris, Madras; Tenasserim, Borneo, Moluccas.

DESCR. OF WOOD:—Colour white. Close-grained, strong, tough and dense-fibrous.

USES:—Wood adapted for lathe. Agreeable acidic fruits are eaten; unripe ones are pickled.

See—Fruit Trees.

ELÆOCARPUS SERRATUS Linn.

FAM.—Elæocarpaceæ.

COM. NS.:—K. Changbale, Kumbanga.

CHAR.:—A large or moderate-sized tree. *Bark* smooth; dark-coloured; inner-bark dark-brown, fibrous. *L.*—ovate, obovate, bluntly acuminate, coriaceous, glabrous, serrate, with saccate glands in the nerve axils; lateral nerves about 5 on each side of the mid-rib; arching upwards; 5-10 × 2.5-5 cm. Petiole with 2 small glands on either side of apex. *Fl.*—white, in simple racemes from the leaf axil. Sepals narrow, speckled over with raised dots; stamens about 30. *Fr.*—drupe, small, ovoid, pointed, rough with raised minute discs. Stone 3-valved, deeply tubercled and divided into three short claws at the tip. *Fl. t.*—Dec.-Jan. *Fr. t.*—Feb-Apr.

DISTR.:—Southern ghats of N. Kanara from sea-level upwards in the evergreen rain-forests.

DESCR. OF WOOD:—*Colour* grey. *An. rings* prominent, marked by darker wood. *Pores* small, uniform. *Med. rays* moderately broad, scanty, prominent on radial section. Soft, light, almost spongy. *Wt.*—33 lbs. per c.ft.

USES:—Fruit is eaten in Madras and Bengal, where it is called “Wood Olive”. The wood is not of much use.

ELÆOCARPUS SPHÆRICUS Schum.

(ELÆOCARPUS GANITRUS, Roxb.)

FAM.—Elæocarpaceæ.

COM. NS.:—E. The Utrasum Bead tree; H. Rudrak; M. Rudraksh.

CHAR.:—A large tree; about 18 m. high (Brandis). Height 8-12 m.; girth 1-5 m. (S. E. Peal). Young parts silky-pubescent. *Bark* dark-grey, rarely smooth, rough only with small vertical lenticels and very narrow horizontal furrows. *L.*—13-15.6 × 5.2 cm., approximate towards the ends of the branches, oblong-lanceolate or elliptic, acute at the apex; obtuse, or narrowed at the base, serrulate, glabrescent, slightly silky when young. Petiole glabrous, stipules minute, caducous. *Fl.*—white, on slender, short, slightly silky-hairy pedicels; forming numerous, rather dense, drooping racemes. Sepals 5, lanceolate, acute, as long as the petals, slightly pubescent on both sides, with a rib in the middle. Petals 5, somewhat puberulous or glabrescent, oblong, deeply laciniate. Stamens 25-40, short, and inserted on the convex torus. Anthers naked, or armed with short hairs. Ovary ovoid, silky-villous, 5-lobed, 5-celled. Style longer than the stamens, 5-grooved; stigma simple, acute. *Fr.*—drupe, globose, the size of a large cherry, smooth, purple. Nut spherical, elegantly tubercled, 5-grooved. Seeds generally solitary. *Fl. t.*—cold season. *Fr. t.*—hot and rainy season,

DISTR. :—Konkan ghats (Talbot), Kanara ghats and Bombay State (Beddome); Nepal, Assam, Western Ghats. Madhya Pradesh; Madras; Malacca and Malayan Archipelago. This species is now considered doubtfully indigenous in the Western Peninsula (Talbot).

DESCR. OF WOOD :—*Colour* greyish-white. *Pores* small, scanty, often sub-divided or in short radial lines. *Med. rays* fine, numerous, inconspicuous. Fine-grained, strong, tough.

USES :—The hard tubercled nuts of this and several other species are polished, made into beads, and are worn around the neck by fakirs and Brahmins. They are also often set in gold and made into bracelets.

ELÆOCARPUS TUBERCULATUS Roxb.

FAM.—Elæocarpaceæ.

COM. NS. :—K. Bhutali; H. Rudrak; M. Rudraksh.

CHAR. :—A very large evergreen tree buttressed at the base, 15-24 m. high, girth 2.1 m. *Bark* dark-coloured, rough outside, inner bark yellowish. *L.*—crowded at the ends of the branchlets, 15.6-31.2 × 7.8-10.4 cm., oblong-obovate or retuse at the base, remotely serrulate, glabrous above, and more or less downy along the nerves beneath. *Petiole* round, villous or glabrescent. *Stipules* subulate, hairy, deciduous. *Fl.*—2.5 cm. diam., white, on drooping pedicels arranged in erect racemes below the leaves, more than twice the length of the petioles. *Bracts* lanceolate, caducous. *Sepals* 5, lanceolate, downy on both sides. *Petals* 5, cuneate, deeply lacinate, sometimes bifid, villous on the outside and glabrous inside. *Stamens* numerous (70-80); filaments short, very hairy or glabrous. *Anthers* linear, longer than the filaments, terminated by a long awn. *Ovary* ovate, a little compressed, villous, 2-celled. *Style* somewhat longer than the stamens; stigma simple. *Fr.*—drupe, oval, smooth, 4.5-2 cm. long. *Nut* woody, ovate or oval, compressed, tubercled on the flattened sides, distinctly furrowed, 1-2-celled, with the margins thickened. *Seeds* generally solitary, ovate, thin. *Fl. t.*—Nov. onwards. *Fr. t.*—May onwards. Young leaves appear with flowers. Very handsome when in flower.

DISTR. :—Common on the Gairsappa ghats in N. Kanara; Western Peninsula on the ghats of Malabar, Travancore, Coorg; Burma, Java.

DESCR. OF WOOD :—*Colour* white or grey. *Pores* small, uniform in short radial lines or single. *Med. rays* broad and fine, numerous. *An. rings* distinct. Compact, lustrous, smooth. *Wt.*—42 lbs. per c.ft.

USES :—Nuts are made into rosaries and worn by fakirs like those of *E. ganitrus*.

ELÆODENDRON GLAUCUM Pers.

FAM.—Celastraceæ.

COM. NS. :—G. Alan; H. Bakra, Debri; K. Mukariki; M. Aran, Burkas, Tamruj.

CHAR. :—A small tree, grows sometimes to a great height 9-15 m., with a girth of .9-2.4 m. *Bark* usually thick, thin in large trees, grey or dark-coloured, exfoliating in four-sided very small scales. *L.*—5-15.5 × 2-6.5, opposite, elliptic-ovate or oblong, acute or acuminate, crenate or nearly entire, membranous or coriaceous, glaucous when young. *Fl.*—small, pentamerous, yellowish or greenish-white on axillary, diffuse, dichotomous cymes, about half the length of the leaves; peduncles longer than the petioles. *Fr.*—drupe, hard, woody, ovoid or obovoid, 1.3 cm. long, 1-celled, 1-seeded. *Fl. t.*—Feb.-June. *Fr. t.*—ripe in May.

DISTR. :—Throughout the Bombay State in deciduous forests. On the ghats of N. Kanara and Belgaum in evergreen forests, attains considerable dimensions; common in the Goond forests of N. Kanara. Outer Himalayas up to 1,800 m., Oudh, Madhya Pradesh and the W. Peninsula: Ceylon, Malayan Archipelago.

DESCR. OF WOOD :—*Colour* light brown, often with red tinge. The outer wood white but no distinct sap-wood. Even and close-grained. No *an. rings*. Numerous, wavy, concentric lighter-coloured bands. *Pores* small, scanty. *Med. rays* fine, short, very numerous, visible on a radial section as a pretty silver-grain, which is assisted by the alternations of the dark and light bands. Moderately hard, seasons well, but thin planks are apt to warp unless carefully seasoned, polishes well, absorbing little polish. *Wt.*—53 lbs. per c.ft.

USES :—Wood used for house-building, combs, cabinet work and picture-frames. (Bark said to be poisonous, contains 8 per cent. of tannin).

EMBLICA OFFICINALIS Gaertn.

(PHYLLANTHUS INDICA, Muell.)

FAM.—Euphorbiaceæ.

COM. NS. :—*E. Embelic* Myrabolan Tree; G. Ambala, Amla, Bhoza; *H.* Amlika, Anala, Anward, Daula; K. Amalaka, Dadi, Dhatri, Nellikey; M. Avala.

CHAR. :—A small or middle-sized deciduous tree, 9-12 m. high; girth .9-1.8 m. Trunk crooked, branches spreading. *Bark* thick, grey, exfoliating in small irregular patches or conchoidal flakes. *L.*—distichous, alternate, linear-oblong, sub-sessile, imbricate, on 10-20 cm. long branchlets having the appearance of pinnate leaves. *Fl.*—numerous, small, yellowish, on small slender pedicels on axillary fascicles or on the naked portion of the branch below the leaves. Calyx 6-parted, usually glabrous, glands 6, one between each of the segments, Staminal column slender, short, bearing 3-5 oblong anthers. Ovary 3-celled, glabrous. Styles 3, twice 2-cleft. *Fr.*—berry globose, about 2 cm. diam., fleshy, smooth, 6-striated, pale-yellow. *Fl. t.*—Mar.-May. *Fr. t.*—Oct.-Feb. (ripe). Leafless in hot season.

DISTR. :—Throughout the State in deciduous forests. Wild and planted. Konkan, Western Ghats, Deccan. Throughout tropical

and subtropical India, wild or planted: Ceylon, China, Malay Islands.

DESCR. OF WOOD :—*Colour* red. Close-grained. No heart-wood. *An. rings* not distinct. *Pores* small, moderate-sized, uniformly distributed, often sub-divided or in short radial lines. *Med. rays* moderately broad, the distance between two rays generally greater than the transverse diameter of the pores; silver-grain prominent. Hard; warps and splits in seasoning; durable under water; takes fine polish. *Wt.*—52 lbs. per c.ft.

USES :—Wood used for inferior buildings, furniture, agricultural implements, pipes, gun-stocks, well-construction and poles. It gives good fuel. Root, bark, leaves, flowers, fruits and seeds are used medicinally. The fruit is eaten, raw or pickled. Bark, leaves and fruits are used for tanning and dyeing. The tree promises to become important as a source of tannin. A useful coppice tree; branches much lopped for leaf-manure in the Deccan. It is stated that the chips of wood or small branches thrown into muddy water have the property of clearing it. Leaves and fruits are eaten by cattle.

See—Medicinal Plants, Fruit Trees, Dyes and Tans, Dyes, Fodder Plants.

ERINOCARPUS NIMMONII Grah.

FAM.—Tiliacae.

COM. NS. :—*K.* Adivi bhendi, Kad bende; *M.* Chira, Chor, Choura, Haladi; Jangali-Bhendi.

CHAR. :—A small handsome tree. Bark brown, smooth, with narrow longitudinal clefts, fibrous. *L.*—13-20·8 cm. each way, roundish-cordate, irregularly-toothed, palinately 5-9-nerved, sometimes 3-5-lobed; lobes acute, glabrous above, pubescent or glabrescent beneath. Petiole 5·2-13 cm. Stipules caducous. *Fl.*—yellow, nearly 5·2 cm. diam., on short pedicels, in large terminal lax panicles. Bracts cordate-ovate, caducous. Sepals 5, distinct, stellate-pubescent externally. Petals 5, with pit-like glands inside at the base. Stamens numerous, inserted on an elevated torus, free or slightly connate at the base. Ovary pubescent, 3-celled. Style filiform; stigma minute. *Fr.*—bristly, woody, indehiscent, triangular, 3-winged, 1-celled by abortion. Seeds solitary, pendulous, oblong. *Fl. t.*—Sept.-Oct. *Fr. t.*—cold season.

DISTR. :—Deccan (common at Khandala), Konkan, and N. Kanara; Common in mixed monsoon forests of Belgaum and on the ghats below Mahabaleshwar.

DESCR. OF WOOD :—*Colour* white. *An. rings* distinct, marked by more numerous pores in the early spring-wood. Many fine, close, wavy, concentric, white lines. *Pores* few, large, single or sub-divided, scattered irregularly. *Med. rays* fine to moderately broad, long, rather scanty. Moderately hard, smooth. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for yokes and rafters. Bark is said to yield an excellent fibre for rope-making.

See—Fibres.

ERIOALÆNA CANDOLLEI Wall.

FAM.—Sterculiaceæ.

COM. NS. :—K. Hadang ; M. Bute.

CHAR. :—A large deciduous tree, 9-18 m. high ; girth about 1.2-2.1 m. ; young parts stellate tomentose. *Bark* grey. *L.*—13-18.2 × 10.4 cm., ovate cordate, acuminate, irregularly crenate-toothed palmately 5-7 nerved, nerves prominent on the under surface, stellate-tomentose or glabrescent above, grey or white pubescent beneath. *Petiole* 4-7.8 cm., tomentose or glabrescent. *Stipules* lanceolate, small, deciduous. *Fl.*—4 cm. diam., yellow, numerous, in terminal and axillary racemes, nearly as long or longer than the leaves. *Peduncles* long. *Bracteoles* 3, linear, toothed or almost pinnatifid, tomentose. *Sepals* 5, lanceolate, glandular on the inner surface at the base. *Petals* oblong, apex notched, claw villous, incurved. *Staminal column* short, bearing numerous anthers. *Ovary* ovoid, sessile, 10-celled, with numerous ovules in each cell. *Stigmas* 8-10, spreading. *Fr.*—capsule, 5.2 × 2.6 cm., woody, ovoid, acuminate, 10-valved ; valves thinly pubescent or glabrescent. *Seeds* numerous. *Fl. t.*—hot season. *Fr. t.*—cold season. *Sheds leaves* in hot season.

DISTR. :—Throughout the deciduous forests of N. Kanara ; in the valleys of Mahabaleshwar. Bhutan, Burma.

DESCR. OF WOOD :—*Colour* heart-wood brick-red with orange and brown streaks ; old pieces lose their bright colour. *Close-grained.* *Pores* round, moderate-sized, arranged in concentric lines, and sometimes joined by narrow wavy, concentric bands of soft tissue, prominent on a vertical section. *Med. rays* numerous, white, prominent, fine and moderately broad. *An. rings* marked by sharp concentric lines. *Hard, tough, strong, shining ; seasons well ; takes a good polish.* *Wt.*—about 50 lbs. per c.ft.

USES :—Wood used for house-building, carts, spokes and felloes, rice-pounders, paddles and gunstocks ; also for carpentry.

ERIOALÆNA HOOKERIANA W. & A.

FAM.—Sterculiaceæ.

COM. NS. :—M. Arang, Bute, Bother, Botku.

CHAR. :—A small deciduous tree ; young parts stellate-downy. *Bark* grey, scaly. *L.*—10.4 cm. each way, roundish-cordate, shortly-acuminate, serrate, thinly stellate-hairy, at length glabrous above, rusty-stellate-pubescent beneath. *Petiole* nearly half the length of the leaf. *Stipules* linear, caducous. *Fl.*—5.2 cm. diam., yellow, on peduncles as long as or longer than the petiole, stellate-pubescent, at length glabrous, axillary, 3-flowered. *Bracteoles* deeply cut into numerous linear segments, pubescent, deciduous before the flower expands. *Sepals* 5, lanceolate, densely pubescent externally, silky within. *Petals* 5, shorter than the sepals, with a broad tomentose claw. *Staminal column* short, bearing numerous, linear-oblong anthers in many series. *Ovary* sessile, 7-10-celled, ovoid. *Style* densely pubescent ; *stigma* 8-10-lobed. *Fr.*—capsule 2.6 cm. long,

ovoid, woody, 10-valved; valves hairy, tubercled or pitted. Seeds numerous with a tapering wing above. *Fl. t.*—Mar.-May. *Fr. t.*—Nov. Sheds leaves in the hot season.

DISTR. :—Ravines of Mahabaleshwar; in the forests of Konkan; dry forests of the Satpudas in Khandesh. Bihar, Nilgiris, Madhya Pradesh. *Alt.*—1,200 m.

DESCR. OF WOOD :—*Colour* light-red. *An. rings* marked by an almost continuous line of pores. *Pores* small and moderate-sized, often sub-divided, enclosed in rings of soft texture. *Med. rays* moderate-sized, wavy. Tough and strong; polishes well. *Wt.*—56 lbs. per c.ft.

USES :—Plough and other agricultural implements. Liber yields excellent fibre.

ERIOLOENA QUINQUELOCULARIS Wight.

FAM.—Sterculiaceæ.

COM. NS. :—*M. Bothi.*

CHAR. :—A small tree; young parts stellate-tomentose. *L.*—6.5-7.8 cm. each way, round or ovate, shortly acuminate at the apex, cordate at the base, palmately 7-nerved, serrate, thinly pubescent or glabrescent above, silvery and soft pubescent or tomentose beneath. Petiole 5.2 cm. *Fl.*—2.6 cm. diam., on long peduncles, arranged into cymes at the ends of branches. Bracteoles minute, 3-5-lobed, very caducous. Sepals 5, oblong-linear, with 2 glands within at the base. Petals 5, about the length of the sepals; claw coriaceous, dilated, hairy. Staminal column as long as the petals, conical, covered with numerous anthers. Ovary ovoid, 5-celled. Style 1, slender; stigma 5-lobed, lobes hairy, revolute or spreading. *Fr.*—capsule, 2.2 cm. long, woody, 5-10 valved; valves not tubercled. Seeds numerous, winged. *Fl. t.*—July.

DISTR. :—In the forests of the Konkan and Belgaum ghats; Western forests of Madras State; Nilgiris and Bihar. *Alt.*—300-1,200 m.

DESCR. OF WOOD :—*Colour* dark-grey or reddish mottled. *Pores* small, divided, joined by wavy bands of white tissue. *Med. rays* medium or fine. Hard, heavy, smooth, strong.

USES :—Used for various purposes.

ERYTHRINA STRICTA Roxb.

FAM.—Papilionaceæ.

COM. NS. :—No common names.

CHAR. :—A moderate-sized deciduous tree; branches armed with numerous whitish prickles. *Bark* greenish-yellow, rough, armed with white prickles. *L.*—unarmed; petioles 15 cm. long, sometimes prickly. Leaflets 7.5-13 cm. long, nearly as broad as long, the terminal reniform-cordate, the lateral unequal-sided, ovate-cordate or subacute at the base, all shortly acuminate, glabrous. *Fl.*—in terminal horizontal racemes arranged in fascicles of 1-3, along the rachis; pendulons, stout, woody. Calyx spatheform, 1.3 cm. long,

sub-glabrous, entire at the tip, splitting to the base down the back. Corolla bright scarlet; standard 4 cm. long, oblong-lanceolate, keel half as long as the standard, four times as long as the wings. *Fr.*—pod, 7.5-15 cm. long, narrowed at both ends, slightly torulose, compressed, stalked, stalk longer than the calyx. Seeds 1-3, light brown. *Fl. t.*—Feb.-May. *Fr. t.*—June.

DISTR. :—In the deciduous forests of Konkan and N. Kanara : Elephanta near Bombay. Sinhgad near Poona ; Western Peninsula, Assam, E. Bengal, Nepal.

DESCR. OF WOOD :—*Colour* grey. Soft, light, spongy, Wood structure the same as that of *E. suberosa*. *Wt.*—16 lbs. per c.ft.

USES :—Same as *E. variegata* and *E. suberosa*.

ERYTHRINA SUBEROSA Roxb.

FAM.—Papilionaceæ.

COM. NS. :—*H.* Dauldhak, Nasut, Madara, Pangra ; *M.* Pangara.

CHAR. :—A moderate-sized deciduous tree, 12-15 m. high. *Bark* corky, light grey, with deep irregular vertical cracks, varying in thickness up to 2.5 cm ; inner bark fibrous. Branches numerous, crooked, spreading, armed with yellowish-white prickles, which fall off after the third year. *L.*—usually unarmed, but sometimes with a few scattered prickles ; petioles 10-20 cm. long, often prickly. Leaflets pale, 10-15 cm. long and broad, the terminal rhomboid-ovate, the lateral obliquely and broadly ovate-cordate, all glabrous above, densely downy beneath. *Fl.*—racemes 1-4, near the ends of the branchlets, densely capitate, 5-10 cm. long. Peduncles short ; pedicels in fascicles of 1-3. Calyx more or less pubescent, soon becoming bilabiate. Corolla scarlet, standard 3.7-5 × 1.3-1.6 cm. ; keel petals less than half as long as the standard, connate, much longer than the minute falcate wings. *Fr.*—pod, stalked, 13-15 cm. long, subterete, distinctly torulose. Seeds 2-5. *Fl. t.*—Apr.-May. *Fr. t.*—June.

DISTR. :—Throughout the dry forests of the State, Deccan (Poona Maval), Khandesh. Gujarat ; Lower Himalayas and sub-Himalayan forests from the Ravi to Nepal. Common in Behar, Madhya Pradesh, Chota Nagpur, Orissa, the Circars ; Burma.

DESCR. OF WOOD :—*Colour* white ; that near the centre of darker colour but not a regular heart-wood. *Pores* very large, very scanty, often sub-divided, conspicuous on a vertical section and markedly septate. *Med. rays* short, broad ; the tissue between the rays reticulated by irregular, more or less concentric interrupted narrow bands of firm texture like med. rays, separating rectangular patches of white, spongy tissue. On the radial section the med. rays appear as broad shining bands, giving the wood a marked silver-grain, and the pores are prominent, while the alternate bands of hard and soft tissue appear as alternate longitudinal streaks. Light, soft, fairly durable. *Wt.*—19 lbs. per c.ft.

USES :—Wood used for scabbards, sieve-frames, planking, jars and boxes to be covered with lacquer.

ERYTHRINA VARIEGATA L. (Var. Orientalis).

(ERYTHRINA INDICA Lam.)

FAM.—Papilionaceæ.

COM. NS.:—*E.* Indian coral tree, Mochi-wood; *G.* Bangara, Panarvo, Pandaroo; *H.* Dadap, Pangara, Pangira; *K.* Halivan, Hongara, Mullumuriga, Salaki; *M.* Pangara.

CHAR.:—A tall deciduous tree, armed with black prickles; petioles and leaves unarmed. *Bark* yellowish, smooth and shining, peeling off in thin papery flakes. *L.*—pinnately trifoliate, on petioles 10-15 cm. long. Leaflets broad-ovate, entire, short, acuminate, somewhat cordate at the base, membranous, glabrous; terminal leaflet 10-15 cm. long and broad, largest round, cuspidate, truncate, or broad rhomboidal at the base. *Fl.*—bright scarlet, large, on pubescent pedicels, arranged in axillary or terminal racemes, 15 cm. long. Calyx 2.5-4 cm. long, spathaceous, with a very oblique mouth, 5-toothed at the top; standard 5.8-3 cm. long; the blade 2.5 cm. broad; wings and keel nearly equal. *Fr.*—legume, 15-30 cm. long, cuspidate, distinctly torulose, blackish; 1-8 oblong, red or purple seeds. *Fl. t.*—Feb.-Mar. *Fr. t.*—May-July. Sheds leaves in cold season; new leaves in Mar.-Apr.

DISTR.:—In the deciduous forests of the Konkan and N. Kanara. Indigenous along sea-coast. Planted as support for pepper-vines, and for grape-vines in the Nasik district. Throughout India from Himalayas southwards, coast forests of Malabar; Burma, Pegu, Andamans and Nicobar. Planted for ornament.

DESCR. OF WOOD:—Structure the same as *E. suberosa* Roxb. Soft, spongy, light, rather durable. *Wt.*—20 lbs. per cft.

USES:—Wood used for boxes, toys, scabbards, etc.

ERYTHROPSIS COLORATA Burkill.

(STERCULIA COLORATA Roxb.)

FAM.—Sterculiaceæ.

COM. NS.:—*H.* Bodala, Samarri, Walena; *M.* Kowsay.

CHAR.:—A moderate-sized tree, 15-18 m. high with girth 1.5-1.8 m. Branches spreading, young parts pubescent. *Bark* grey, scaly, thick; inner bark mostly white. *L.*—15.6-23.4 × 13-31 cm., alternate, crowded at the ends of branches, palmately 5-lobed, cordate at the base; lobes acuminate; common petiole 10.4-23.4 cm. Stipules erect, lanceolate. *Fl.*—numerous, deep orange-red, showy, on short pedicels, arranged in terminal, numerous, erect panicles. Calyx 2-2.6 cm., cylindrical-clavate, leathery, 5-lobed; lobes obtuse, covered with brilliant red stellate pubescence. Corolla none. Anthers about 30, sessile round the border of the apex of the column. Carpels 5, oval. Styles 5, short, curved. Stigma acute. *Fr.*—follicle, 1.5, 5.2-7.8 cm. long., stalked, oblong-lanceolate, glabrous, membranous, opening long before the seeds are ripe, pink outside, and yellowish inside. Seeds ovoid, generally 2, about

the size of a large pea, adhering one to each margin of the carpel near its base. *Fl. t.*—Mar.-Apr., when it is the most beautiful object, appearing as if ornamented with red coral. *Fr. t.*—June-July. Sheds leaves in cold season; new leaves soon after the flowers.

DISTR. :—Throughout deciduous forests in the State. Bengal, Oudh, valleys of the Himalayas and various other parts of India; Ceylon, Burma, Cocos Islands.

DESCR. OF WOOD :—*Colour* grey. Structure similar to that of *Sterculia urens*, but *med. rays* broader and shorter, and transverse bars distinct. Very soft. *Wt.*—24 lbs. per c.ft.

USES :—Makes a fair quality of wood-pulp with good bleaching power. Bark yields a fibre.

See—Fibres.

EUGENIA LÆTA Buch. Ham.

FAM.—Myrtaceæ.

COM. NS. :—*H.* Kan-jamb.

CHAR. :—A large shrub or a small tree; branches terete, slender, smooth. *L.*—7·5-11·3 × 2·5-4·5 cm., lanceolate or oblong-lanceolate, with a longish obtuse acumen, pellucid-dotted, glabrous, base tapering, 12-15 pairs of main nerves uniting into an intramarginal nerve. *Fl.*—4·5 cm. across when expanded, solitary or few, in terminal or axillary cymes; pedicel jointed below the calyx. Calyx tube narrow, suddenly expanded at the mouth; lobes 4, rounded, reflexed. Petals white, 1·3-1·5 cm. long, orbicular, glandular, veined; buds globose. Disk thickened. Stamens very numerous, bright-crimson, much exceeding the petals. *Fr.*—berry, oblong, ellipsoid, 2·5 × 2 cm., dark brown crowned with calyx-lobes. *Fl. t.*—Nov.-Jan. *Fr. t.*—hot and rainy season.

DISTR. :—In the evergreen forests, on the higher ghats of N. Kanara; common on the Gairsappa ghat; Western Peninsula, Travancore.

DESCR. OF WOOD :—*Colour* grey. *Pores* small, in rough, very narrow, concentric rings. *Med. rays* very fine, very numerous. Hard. *Wt.*—55-58 lbs. per c.ft.

USES :—Not known.

EUGENIA UTILIS Talb.

FAM.—Myrtaceæ.

COM. NS. :—*K.* Hennerl.

CHAR. :—A large quite glabrous tree; branches terete, trunk straight, cylindrical. *Bark* grey, scaly. *L.*—coriaceous, 5·7·5 × 2·5-4 cm., elliptic, abruptly or shortly acuminate, gland-dotted, base acute. *Fl.*—small, in axillary and terminal corymbose paniced cymes, shorter than the leaves, 2-3 flowers together on the ends of angular cyme-branches; buds globose or pear-shaped. Calyx turbinate, externally rugulose, indistinctly 4-lobed. Petals calyptrate.

Fr.—black, small, succulent, crowned with persistent calyx. *Fr. t.*—May-June.

DISTR. :—Common in evergreen forests in the southern parts of N. Kanara.

DESCR. OF WOOD :—*Colour* reddish-brown. *Pores* moderate-sized, sub-divided and in short rows. *Med. rays* moderately broad, indistinct. Tough, moderately heavy. *Wt.*—42 lbs. per c.ft.

USES :—Wood greatly in demand for building purposes throughout the Sirsi sub-division of N. Kanara.

EUPHORBIA ANTIQUORUM Linn.

FAM.—Euphorbiaceæ.

COM. NS. :—G. Tandhari-send ; K. Tindari-send (Belgaun) ; M. Narsoj.

CHAR. :—A large shrub or a small tree, 4·5-9 m. high, trunk stout, sometimes nearly 30 cm. in diameter, cylindric or fluted. *Bark* thick, rough, brown. Branches numerous curving upwards, stout, fleshy, green, jointed, with 3-5 wide, thick, sinuate wings narrowed at either end in each joint and coarsely repand, crenate. *L.*—minute, fleshy, or warty. *Fl.*—yellowish ; peduncles solitary or in pairs, arising from a little above the fallen leaves, usually with 3-flowered heads, the centre head fertile. *Fr.*—capsule, deeply 3-lobed. *Fl. t.*—rainy season.

DISTR. :—Not common ; dry districts of the State. Belgaum and Bijapur districts. Throughout the hotter parts of India : Ceylon.

DESCR. OF WOOD :—*Colour* grey. Soft, light, even-grained. Similar to the wood of *Givotia rottleriformis* Griff (Talbot). *Wt.*—25 lbs. per c.ft.

USES :—Wood worth while trying for toys and other fancy articles. Plant used as hedge.

EUPHORBIA LIGULARIA Roxb.

FAM.—Euphorbiaceæ.

COM. NS. :—G. Thor.

CHAR. :—An erect fleshy glabrous shrub or small tree, seldom reaching 6 m. high ; branches scattered ascending, the young ones five-sided, angled, with short stipular sharp thorns arising from thick tubercles arranged in 5 irregular rows. *L.*—15-30 × 5-7·5 cm., alternate, near the tops of branches, obovate oblong, acute, deciduous, base narrowed into a very short petiole ; stipular thorns solitary or in pairs. *Fl.*—involucres yellowish, hemispheric, in small, stout, dichotomous cymes ; the lateral ones of the cyme pedicellate, the central sessile and usually male ; lobes large, erect, roundish, fimbriate ; glands transversely, oblong. *Fr.*—capsule, deeply 3-lobed, about 1·3 cm. broad. *Cocci* compressed. *Fl. t.*—Mar. The new leaves appear after the flowers.

DISTR. :—Throughout the State ; often planted as a fence : Western Peninsula : Ceylon, Baluchistan, Malay Islands.

DESCR. OF WOOD :—Same as *E. neritifolia* Linn.

USES :—Wood occasionally used for fuel.

EUPHORBIA NERIIFOLIA Linn.

FAM.—Euphorbiaceæ.

COM. NS. :—G. Thor ; K. Yellikalli ; M. Nivdung, Kante-sabar.

CHAR. :—A large glabrous fleshy erect deciduous shrub or small tree, reaching 6 m. or more high ; branches round, somewhat verticillate, with pairs of sharp stipular spines, arising from low, conical truncate, distant, spirally arranged tubercles. *Bark* reticulated. *L.*—towards the end of the branches, fleshy, alternate, $10-20 \times 3.1-6.3$, obovate, rounded at the apex, tapering towards the base. *Fl.*—involucres hemispheric, 3-nate, forming small solitary or twin cymes from above the leaf-scars ; the central flower of each cyme male, sessile, the two lateral 2-sexual, pedicellate. *Fr.*—capsule, .6 cm. broad. Seeds smooth. *Fl. t.*—and *Fr. t.*—Feb.-Mar. Sheds leaves Oct.-Dec. ; new leaves at the beginning of rainy season.

DISTR. :—Dry rocky hills. Gujarat—common ; often planted in hedges. N. W. Himalayas. Western Peninsula : Sind, Burma, Pegu.

DESCR. OF WOOD :—*Colour* white. Even-grained. Pith large, round. *Pores* small, very scanty, usually in pairs. *Med. rays* extremely fine and numerous.

USES :—Wood used for fuel. Planted as hedge. Plant gives copious milky-juice.

EUPHORBIA TIRUCALLI Linn.

FAM.—Euphorbiaceæ.

COM. NS. :—*E.* Indian Tree Spurge, Milk-bush ; G. Dandalio thor, Paradeshi thor ; H. Sahud, Sondh, Shirthahar ; K. Bottu-galli, Kodu-or Mondu-kalli ; M. Nangya sher, Nevali sher.

CHAR. :—A small tree about 6 m. high ; girth .3-.6 m. *Bark* brown or greenish-brown. Branches spreading, cylindric, rush-like, smooth, green, almost leafless. *L.*—small, linear, 6-13 mm. long, appearing in rainy season. *Fl.*—involucres clustered in the forks of branchlets, mostly female, campanulate. *Fr.*—capsule, cocci velvety. Seeds ovoid, smooth. *Fl. t.*—Aug.-Sept.

DISTR. :—Naturalised throughout the dry districts of India and the State ; cultivated as hedge plant all over : Native of E. Africa Ceylon.

DESCR. OF WOOD :—*Colour* white or grey. Close-grained. *Pores* small, single or sub-divided in 2 or 3, very scanty. *Med. rays*, extremely fine, numerous, regular. Moderately hard, strong.

USES :—Wood used for making toys. Tree generally used for hedges. Plant and juice used medicinally. The charcoal from the wood is good, it is said, for the manufacture of gun-powder. (This requires confirmation).

See—Medicinal Plants.

EURYA JAPONICA Thunb.

FAM.—Ternstroëmiaceæ.

COM. NS. :—No common names.

CHAR. :—A small or moderate-sized evergreen tree, 4·5-7·5 m. high, with a girth of ·3-·45 m., glabrous, branchlets angular. *Bark* thin, grey-brown, with lines of small light-coloured lenticels. *L.*—5·2-13 × 2·6-4 cm., alternate, oblong-lanceolate to elliptic-lanceolate, acuminate at both ends, obtusely serrate, coriaceous, hairy when young, on a short thick petiole. *Fl.*—dicecious, small, white, on short, glabrous, drooping pedicels, solitary or in fascicles, axillary or from the axils of fallen leaves. Sepals and petals 5, much imbricate, the latter connate at the base. Stamens 12-15, inserted at the base of the corolla in a single series. Anthers adnate, opening longitudinally. Ovary ovoid, usually 3-celled. Styles 3, rarely 4-5, slender, distinct or united at the base. *Fr.*—baccate, globular, smooth, small, crowned by the persistent base of the style. *Fl. t.*—Mar.-June. *Fr. t.*—rainy season.

DISTR. :—Forests of Southern Konkan; hills of South India. E. and W. Peninsula; Eastern Himalayas; Sikkim, Khasia Hills. Hill forests of Martaban and Tenasserim; Ceylon. Alt. 900-2,700 m.

DESCR. OF WOOD :—*Colour* brown; occasional medullary patches. *Pores* small, scanty. *Med. rays* fine to moderately broad, very numerous, close. Soft, close-grained.

USES :—Useful fuel. In Sikkim trees pollarded for leaf-manure.

EXCECARIA AGALLOCHA Linn.

FAM.—Euphorbiaceæ.

COM. NS. :—*E.* The blinding tree; K. Hars; M. Geva, Phungli, Surund.

CHAR. :—A small poisonous evergreen tree with white highly acrid juice, 4·5-7·6 m. high; girth ·6-1·5 m. *Bark* grey, smooth, shining, with numerous round prominent lenticels. *L.*—alternate, thickly coriaceous, 5-10 × 3·8-5 cm., elliptic, acuminate, entire or shallowly sinuate-crenate, base acute. *Fl.*—minute, fragrant, yellowish-green, bracts fleshy; male flowers sessile in catkin-like spikes; female flowers pedicellate. Inflorescence raceme, the upper flowers usually imperfect. *Fr.*—capsules, very variable in size, ·6-2·5 cm. in diameter. Seeds subglobose, smooth. *Fl. t.*—July-Aug. *Fr. t.*—Sept.-Oct.

DISTR. :—In tidal marshes along the coast of the State, very common in the Konkan and N. Kanara. Tidal forests on the sea-coast of India: Ceylon, Tropical Asia, Indian Archipelago, N. Australia.

DESCR. OF WOOD :—*Colour* white or yellow. *Pores* small, scanty, usually in radial lines. *Med. rays* very numerous, extremely fine. Soft, spongy. *Wt.*—36 lbs. per c.ft. (Talbot). 28 lbs. per c.ft. (Gamble.)

USES :—A useful wood for general carpentry, toys, furniture, etc. Used for charcoal and as firewood. Fishing-nets are usually supported by the floats made from the roots. Sap extremely acrid, poisonous.

The poisonous milky sap is very dangerous to wood-cutters causing blindness if it gets into the eyes, hence the name "Blinding Tree". The generic name *Excœcaria* also refers to the fact that sap hardens into a kind of black caoutchouc.

*See—*Poisonous Plants.

FAGARA BUDRANGA Roxb.

(ZANTHOXYLUM RHETSA DC.)

FAM.—Rutaceæ.

COM. NS. :—*H. Pepuli* ; *K. Junmina*, Sessal ; *M. Cuchli*, Chirphal, Thirphal, Tirphal, Tisul.

CHAR. :—A large tree, trunk straight, height 24-30 m., girth 1.8-2.4 m., in Rampa hills of Eastern ghats ; branches numerous, spreading ; prickles straight or incurved, on every part of the tree. *Bark* cream-coloured, with thick cork in irregular masses, studded with conical spines about 5.2 cm. long, and the same in base diameter. *L.*—about the ends of branches, .3--.45 m. long, equally or unequally pinnate, petiole not winged. Leaflets opposite, from 8 to 20 pairs, 7.8-13 × 5.2 cm., oblong-lanceolate, acuminate, unequal-sided, entire, glabrous, short, petioluled. *Fl.*—small, yellow, diœcious, tetramerous, numerous on terminal and axillary .45 m. broad, dichotomously branched cymes, branches opposite, slightly compressed or angled. Bracts minute, caducous. Petals valvate, longer than the sepals. Disc small. Ovary rudimentary in the male flower, glabrous ; in the female 1-celled. Style thick ; stigma tapering. *Fr.*—capsule, sessile, solitary, globose, size of a pea, tubercled. Seed 1, round, shining, black. *Fl. t.*—cold season when leafless. *Fr. t.*—Feb.

DISTR. :—Khandala, Savantwadi ; Western Peninsula from the Konkan southwards. In N. Kanara in some of the evergreen monsoon forests from the coast inland upto 600 m. elevation ; Coromandel coast.

DESCR. OF WOOD :—*Colour* yellowish-grey. Close-grained. *Pores* small rather scanty, single or in radial strings of 2 to 4. *Med. rays* short, white, numerous, the distance between them about equal to the diameter of the pores. *An. rings* distinctly marked by the darker autumn wood with few pores. Moderately hard. *Wt.*—40 lbs. per c. ft.

USES :—Seeds taste like black-pepper, used as condiments. Essential oil extracted from carpels, used medicinally.

*See—*Condiments and Spices, Oils.

FERONIA LIMONIA Swingle.
(**FERRANIA ELEPHANTUM** Cor.)

FAM.—Rutaceæ.

COM. NS.:—*E.* Elephant or Wood apple; *G.* Kavith, Kotha; *H.* Bilin, Kait, Kat-bel; *K.* Beloda, Byala, Malura, Manmadha; *M.* Kavath, Kavith.

CHAR.:—A deciduous tree, armed with strong, straight axillary thorns, 6-9 m. high and 6-12 m. girth. *Bark* grey or nearly black, very rough, thick, wrinkled, with longitudinal shallow furrows. *L.*—5.2-10.4 cm., alternate, imparipinnate, quite glabrous, shining. Petiole slightly winged or not. Leaflets 5-7, about 3.1 cm. long, opposite, lanceolate, cuneate or obovate, obtuse, entire or crenate towards the apex, membranous, almost sessile. *Fl.*—polygamous by abortion, dull red, on slender pedicels, in terminal or axillary, lax panicles. Calyx small, 5-toothed, deciduous. Petals 5, sometimes 4-6, spreading, imbricate. Stamens 10-12, inserted around a short disc. Filaments dilated at the base. Anthers linear-oblong. Ovary in the male flower small, abortive; stigma 5-lobed. Ovary in the female flower, oblong, 5-6 celled, or at length 1-celled. Style none; stigma large, 5-lobed, deciduous. *Fr.*—berry, large, 6.5 cm. diam. or larger, globose, woody, hard, grey-coloured, rough, 1-celled, many-seeded. Seeds numerous, imbedded in a fleshy edible pulp. *Fl. t.*—Feb.-Apr. *Fr. t.*—rainy season; sheds leaves during hot season.

DISTR.:—Common in Konkan and Deccan, throughout India in dry situations. Often cultivated; indigenous in S. India; Java, Ceylon, Burma.

DESCR. OF WOOD:—*Colour* yellowish or greyish-white. Even-grained. *Pores* small or moderate-sized, ringed, sub-divided or in small patches, often filled with resin. *Med. rays* short, white, prominent, moderately broad. *An. rings* marked by a white line and the fewer pores of the autumn wood. Hard rather heavy, strong; takes a fine polish. *Wt.*—about 50 lbs. per c.ft.

USES:—Wood used for house-building, oil-crushers, naves of wheels, agricultural implements; well suited for ornamental carving. It yields a white, transparent gum, resembling gum arabic; this, along with other gums, forms part of the East Indian gum arabic of commerce. Fruit pulp acid and sweet, is eaten, made into chutneys, jelly or syrup. Leaves, which have a slight smell of anise, and unripe fruits, are used medicinally.

See—Medicinal Plants, Fruit Trees, Gums and Resins.

FICUS ASPERRIMA Roxb.

FAM.—Moraceæ.

COM. NS.:—*G.* Kal-ambar; *K.* Gargalli, Khargas; *M.* Kharwat.

CHAR.:—A shrub or a small tree without aerial roots. Young parts scabrous. *Bark* white smooth. *L.*—crowned at the ends of the

branchlets, 4-12.5 × 2.1-7 cm., alternate, oblong-lanceolate to ovate or obovate, serrate, toothed or crenate in the upper part, scabrid and hispid on both sides, entire or very rarely irregularly 3-lobed, blunt or acuminate, base rounded, 3-nerved. *Receptacles* solitary, pedunculate, globose, 1.3-2 cm. in diameter, slightly depressed at the apex, when ripe, yellow or purple with yellowish dots, scabrous-hispid with a prominent umbilicus. Basal bracts 0. *Fr. t.*—ripe Mar.-Apr.

DISTR. :—Throughout the moist forests of N. Kanara and the Konkan, very common. Fitzgerald ghat below Mahabaleshwar; S. M. Country, Ramghat. Western Peninsula, Madhya Bharat: Ceylon.

DESCR. OF WOOD :—*Colour* white or yellowish-grey; with regular wavy concentric but often anastomosing bands of alternate pale loose tissue and darker hard tissue. *Pores* large, usually sub-divided into 2 or 3 partitions, scanty. *Med. rays* moderately broad, not numerous. Soft, warps and splits. *Wt.*—33 lbs. per c.ft.

USES :—The rough leaves are used as sand-paper for polishing, especially for sandal-wood carvings.

FICUS BENGALENSIS Linn.

FAM.—Moraceæ.

COM. NS. :—*E.* Banyan Tree; *G.* Vad, Vadlo; *H.* Bar, Bar-gad or gat; *K.* Ala, Coli, Nyagrodha, Vat; *M.* Wad.

CHAR. :—A large evergreen tree, reaching 30 m. high; girth 6-7.5 m.; sending down many aerial roots from the branches and thus extending the growth of the tree indefinitely. These roots afterwards develop into separate trunks. *Bark* 1.3 cm. thick, greyish-white, smooth, exfoliating in small irregular plates. *L.*—coriaceous, 10-20 × 5-12.5 cm., ovate to elliptic, base cordate or rounded, shining above, peduncles up to 5 cm. long. *Receptacles* globose, about 2 cm. in diameter, with male, female and gall flowers. *Fr. t.*—Mar.-June.

DISTR. :—Planted throughout the State in avenues as road-side tree. Self-sown trees with very large crowns are found in Poona and Satara districts and in Western ghats. One tree, near Junnar (in Poona District), with 68 stems descending from the branches is capable of affording shade to 20,000 men (Sykes). Found wild in Sub-Himalayan forests and Western Peninsula hill ranges of South India.

Very large tree near Javali village, Satara District. The measurements of this tree taken in 1882 were as follows :—circumference of head 1,587 ft., length from north to south 595 feet, and from east to west 442 ft. (Sir C. King).

DESCR. OF WOOD :—*Colour* grey. No heart-wood, but narrow, wavy, concentric bands of soft tissue alternating with broader bands of firmer tissue and darker colour. *Pores* moderate-sized and large, sometimes very large, often sub-divided, scanty, scattered irregularly. *Med. rays* fine, equidistant, clearly marked

but not numerous. On a radial section pores and soft bands are distinctly marked, giving the wood a characteristic grain, the larger pores frequently oblique. Moderately hard, durable under water. *Wt.*—36 lbs. per c.ft.

USES :—Wood used for well-curbs. If carefully cut and seasoned it has a pretty grain and good texture and can be made into furniture. The wood of the aerial roots is stronger, tough, and is used for tent poles, cart yokes, and poles for carrying loads. From the coarse fibre of the bark and small roots ropes are made, and these are used for slow-matches. Bird-lime is made of the milky juice. Leaves are used in lieu of plates by Brahmins. Lac is sometimes collected from this tree in Ceylon and other parts. Bark, root fibres, leaves, seeds and milky juice are used medicinally. Leaves are rarely eaten by goats, but they are largely cut and used as elephant fodder.

Birds are fond of the fruit and the seeds pass through them and are ejected on the branches of other trees in their droppings. The seeds germinate and roots are gradually pushed downwards along the branches and stem until they reach the ground where they strike root; the stem then grows and eventually envelopes and kills the host. To buildings of all kinds the banyan tree is most destructive; the seedlings once rooted in crevices are almost impossible to extirpate.

See—Fibres, Medicinal Plants, Fodder Plants.

FICUS CALLOSA Willd.

FAM.—Moraceæ.

COM. NS. :—No common names. नयन

CHAR. :—A large evergreen tree, 12-18 m. high, with pearly white juice and without aerial roots; branchlets hoary, warted. *Bark* smooth. *L.*—10-17.5 × 5-14 cm., in barren shoots often 30 cm. long or more, of a rigid hard coriaceous texture, elliptic, obtuse, with entire, slightly recurved margins, smooth and shining above, pale beneath, pubescent when young, scaberulous but glabrous when old, base broad, rounded, 3-5 nerved. *Receptacles* pedunculate, solitary, axillary, subglobose, 2.5-3.1 cm. diameter, yellow when ripe, slightly depressed at the top and contracted at the base into a short stalk. Bracts 3, broadly ovate. *Fr. t.*—ripe June-July.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara; Western Peninsula from Kanara southwards: Burma, Andamans, Ceylon.

DESCR. OF WOOD :—*Colour* white or greyish-brown; alternate layers of narrow loose tissue and broader firm tissue. *Pores* large, much sub-divided, irregular, fairly numerous. *Med. rays* moderately broad, not very numerous. Soft. *Wt.*—42 lbs. per c.ft.

USES :—Not known.

FICUS ELASTICA Roxb.

FAM.—Moraceæ.

COM. NS. :—*E.* Indian Caoutchouc or Rubber Tree ; *M.* Rabarache Zad.

CHAR. :—A gigantic tree, perfectly glabrous, sending down many aerial roots from the branches ; trunk supported by high branching buttresses. *Bark* reddish-brown, smooth but scurfy ; in open spaces it is sometimes grey. *L.*—shining, elliptic, abruptly and shortly acuminate, $12.5-25 \times 1.3-6.3$ cm., parallel nerved, stipules pink up to 15 cm. long. *Receptacles* enclosed, while young by hooded involucre, which fall off leaving a saucer-shaped base under the fruit, sessile. Greenish-yellow when ripe, ovoid-oblong, 1.3 cm. long.

DISTR. :—Grown as an ornamental tree in gardens in Bombay and Poona ; also in Belgaum fort. A native of the Outer Himalayas, Assam, Khasia Hills ; Burma, Malayan Archipelago.

DESCR. OF WOOD :—*Colour* light brown ; with alternate, concentric bands of soft, dark tissue. *Pores* moderate-sized to large, scanty, unevenly distributed. *Med. rays* fine to moderately broad, wavy, unequally distributed. *Soft. Wt.*—about 43 lbs. per c.ft.

USES :—Wood not used. The milky juice contains caoutchouc.

FICUS GIBBOSA Blume, Var. PARASITICA King.

FAM.—Moraceæ.

COM. NS. :—*G.* Umbar ; *M.* Dativ.

CHAR. :—A small or sometimes a large tree, often epiphytic or climbing, enclosing the trunks of trees in a net-work of branches or creeping along old walls and on the sides of walls. *Bark* thin, smooth, greenish-yellow. *L.*—7.5-15 cm. long, thinly coriaceous, more or less rhomboid, minutely hispid, obtuse, acute or acuminate, scabrid beneath, often unequal-sided. *Receptacles* pedunculate, solitary or in pairs or fascicled, axillary and from below the leaves, small, depressed globose or globose-pyriform, mammillate, sub-scabrid, without basal bracts, yellow when ripe. *Fr. t.*—ripe in Apr.-May.

DISTR. :—Throughout the State, common on old walls or sides of wells ; throughout the moist and dry forests of the W. ghats. Throughout India from Kumaon to Burma, and southwards to the Malay Peninsula ; Andamans, Ceylon.

DESCR. OF WOOD :—*Colour* light-brown or grey ; divided into alternate broad hard dark and narrow light soft, more or less wavy concentric rings. The light rings occasionally anastomose. *Pores* moderate-sized to large, scanty, irregularly distributed. *Med. rays* moderately broad, light coloured, rather short, not numerous. *Soft to moderately hard. Wt.*—42 lbs. per c.ft.

USES :—Leaves are used to polish ivory ; they are fed to cattle to increase the flow of milk. Root-bark is employed in Indian medicine.

See—Fodder Plants.

FICUS HISPIDA Linn.

FAM.—Moraceæ.

COM. NS.:—G. Dhed-umera; H. Gobla, Kagsha, Kat-gularia, Konea dumbar, Totmila; M. Bokria, Dhed-umber, Kala-umber, Kharoti, Kurwat.

CHAR.:—A shrub or a small tree, 6-9 m. high; girth, 9-12 m. Bark grey, peeling off in irregular flakes, with slight horizontal ribs encircling the tree. Young shoots hispid. L.—10-22.5 cm. long, opposite, ovate or obovate-oblong, shortly acuminate, crenate, serrate, more or less rough on both sides, with short stiff hairs. *Receptacles* ovate or globose, size of a cherry, yellowish, hairy, in pairs, arising from the axils of the leaves or from the trunk and branches; or in pairs or fascicles on elongate stipular bracteate leafy branches issuing from larger branches or stem and often reaching the soil. *Fr. t.*—ripe in hot and rainy season. The opposite leaves are characteristic of this species.

DISTR.:—Throughout the Konkan and N. Kanara, often along the banks of rivers and in moist situations; common in the moist forests near Karwar and along the coast. Throughout India from the Punjab in the north-west to Malacca and Ceylon.

DESCR. OF WOOD:—*Colour* dirty-grey; irregular concentric bands of soft tissue, which alternate with firmer bands of equal width and darker colour. No heart-wood. *Pores* scanty, moderate-sized, often oval and sub-divided. *Med. rays* moderately broad and fine, prominent as long narrow bands on a radial section. Soft. *Wt.*—35 lbs. per c.ft.

USES:—Leaves are lopped for cattle fodder.

See—Fodder Plants.

FICUS LACOR Buch. Ham.

(FICUS INFECTORIA Roxb.)

FAM.—Moraceæ.

COM. NS.:—G. Pepri; H. Kahimmal, Khabar, Pakhar, Pilkhan; K. Hari-or Kari-basri; M. Busari, Dhed-umber, Lendva, Pakari.

CHAR.:—A large spreading, deciduous, fast-growing tree, 12-15 m. high; girth 1.5-2.7 m. Seldom throws down one or two aerial roots. Bark grey, smooth, scaly, exfoliating irregularly in flakes and patches; inner bark tough, fibrous, milky. L.—9-12.5 × 5-6.3 cm., membranous, ovate or ovate-oblong, with entire, sub-undulate margins; 3-nerved; base usually rounded, slightly cordate, sometimes acute; petiole 4-7 cm. *Receptacles* axillary in pairs, sessile, globose, .6 cm. in diameter, whitish, flushed with red and dotted when ripe; basal bracts 3, minute. *Fr. t.*—ripe May-June. Leaves renewed Feb.-Apr.

Var. *lambertiana* King. Leaves more coriaceous, base broad, rounded, emarginate or subcordate. *Receptacles* .9-1.2 cm. diameter.

Var. *wightiana* King. Leaves smaller, often only 6.3 cm. long, narrowed at the base. Receptacles large for the size of the leaves.

DISTR. :—Common throughout the State usually in dry forests. Var. *lambertiana* is common in N. Kanara in moist forests near Yellapur and elsewhere. Var. *wightiana* found in the southern parts of N. Kanara, not so common. Suleman and Salt ranges, the outer Himalayas, plains and hills of India, Bengal, Assam, Burma.

DESCR. OF WOOD :—*Colour* grey ; with narrow concentric bands of soft tissue alternating with broader bands of firm texture. *Pores* large, scanty, often sub-divided. *Med. rays* uniform, moderately broad, equidistant. Moderately hard. *Wt.*—about 34 lbs. per c.ft. (Berar).

USES :—Wood is sometimes used for charcoal. Young shoots are eaten in curries: Leaves make good elephant fodder. Bark gives a fair fibre.

See—Fibres, Fodder Plants.

FICUS MYSORENSIS Heyne.

FAM.—Moraceæ.

COM. NS. :—K. Chungal, Goli, Goni ; M. Bhur or Bhurli-wad.

CHAR. :—A large tree with a shady head, often leafless in ripe fruit (Talbot) ; 15-18 m. high ; girth 1.2-1.5 m. Aerial roots few embracing the stem. *Bark* thick, grey, rough. Young parts and fruit covered with dense tomentum. *L.*—10-22.5 × 6.3-12.5 cm. on petiole 2-8, cm. ovate or ovate-elliptic, acuminate, coriaceous, glabrous by age ; primary veins 8-12 on each side, confluent at the margins, much reticulated and prominent beneath. *Receptacle* twins, axillary, sessile, globular or ellipsoid, size of a small cherry, red, male flowers near the apex. Bracts 3, small, pubescent. Achenes ovoid. *Fr. t.*—ripe Apr.-May.

Var. *pubescence* King.—Leaves smaller with fewer lateral nerves and with repand margins ; tomentum denser, larger, more copious, deep rusty-red.

DISTR. :—Throughout the Konkan and N. Kanara forests along the ghats, also near villages and in open situations ; self-sown or planted. Forests of the base of the Himalayas from Sikkim eastwards ; Deccan Peninsula, Burma, Ceylon.

DESCR. OF WOOD :—*Colour* grey. *Pores* moderate-sized, few sub-divided, mostly in the narrow, wavy, bands of white tissue. *Med. rays* medium or fine, somewhat sinuous. Soft, smooth. *Wt.*—40 lbs. per c.ft.

USES :—A good tree to shade coffee plants.

FICUS RACEMOSA Linn.

(FICUS GLOMERATA Roxb.)

FAM.—Moraceæ.

COM. NS. :—E. Gular-or Country Fig ; G. Umar, Umro, Umbro ; H. Demer, Gular, Lalka, Umar ; K. Atti, Rumadi ; M. Umbar.

CHAR. :—An evergreen tree, 15-18 m. high; girth 1.5-2.4 m. sometimes more in favourable circumstances. *Bark* thick, brownish-grey, rather smooth, scaly glabrous. *L.*—7.5-15 × 3.2-6.3 cm. alternate, ovate-oblong to lanceolate, entire, acute, smooth on both sides, pale beneath and covered with minute green dots. *Receptacles* large, size and shape of a common pear, purplish when ripe, arising in short paniculate clusters from the trunk and larger branches. *Fr. t.*—usually Mar.-July.

DISTR. :—Common throughout the State near villages, along roadside, and along the streams and rivers; common in Western ghats and Konkan, Deccan Peninsula. Salt Range and Rajasthan to the Khasia mountains: Burma, Ceylon.

DESCR. OF WOOD :—*Colour* grey or greyish-brown, with broad light-coloured bands of loose tissue alternating with narrower interrupted darker bands of firmer texture; mottled on longitudinal section. *Pores* large and very large, sub-divided. *Med. rays* moderately broad and fine, bent where they touch the pores. Soft, not durable but said to last well under water; decays quickly if exposed. *Wt.*—about 30 lbs. per c.ft.

USES :—Wood is used for cheap furniture, doors of huts, well-construction, cross-pieces of carts, yokes and axles, tea-boxes, carved images and toys, ploughs, oars, cooper's work; used by the Ordnance Department for fuse-box fittings, bellows and bale-hoops; makes a somewhat inferior quality of wood pulp rather wanting in bleaching power. Root, bark, leaves, fruits and milky juice are used medicinally; juice is also made into bird-lime. The ripe fruits are eaten but they are generally full of insects; unripe fruits, in times of scarcity, are pounded with rice and made into cakes. Leaves are good fodder for cattle and elephants.

See—Medicinal Plants, Fodder Plants, Famine Plants.

FICUS RELIGIOSA Linn.

FAM.—Moraceæ.

COM. NS. :—*E.* Peepal Tree; *G.* Jari, Pipra, Pipal; *H.* Pipal, Pipli; *K.* Arani, Ashwathamara, Pippala, Ragi; *M.* Pimpal.

CHAR. :—A large evergreen, usually epiphytic tree but without aerial roots, 24-27 m. high; girth 7.5-9 m. *Bark* grey, nearly 1.3 cm. thick, exfoliating in rounded irregular flakes of varying size, often leaving rounded depressions. *L.*—coriaceous, 10-18 × 7.5-10 cm., ovate, rotund, narrowed upwards and the apex produced into a linear-lanceolate tail, entire; base broad, rounded, truncate, shining. *Receptacles* in pairs, axillary, sessile, depressed, globose, 13 mm. in diameter, male flowers few, only near the mouth of the receptacle, gall and fertile female flowers sessile or pedicelled. *Fr. t.*—ripe May-July (sometimes towards the end of rainy season).

DISTR. :—Planted near temples and in villages throughout the State. Wild in the sub-Himalayan tract, Bengal and Madhya Bharat. Planted all over.

DESCR. OF WOOD :—*Colour* greyish-white; having narrow bands of soft tissue, which alternate with broader bands of firmer

substance. *Pores* moderate-sized and large, often sub-divided, rather scanty. *Med. rays* uniform and equidistant, moderately broad. Moderately hard. *Wt.*—35 lbs. per c.ft.

USES :—Wood is used for packing-cases and occasionally for felloes of wheels; also used as fuel and for charcoal. Root, leaves, bark and fruit are used medicinally. Bark gives a tenacious milky juice which hardens into a substance resembling guttapercha. Silk worms (the Gori silkworm) feed on the leaves of this tree in Assam. It is one of the trees on which the lac insect (*Carteria lacca* Keer) lives; and on it also is sometimes found the Chinese white-wax insect (*Ceroplastes ceriferus* Sign). Tree is largely lopped for cattle, elephant and camel fodder chiefly by non-Hindus.

The pipal tree is regarded as one of the most sacred trees of the Hindoos and Buddhists. The tree does much harm to buildings, walls and wells, as when once rooted the seedlings are most difficult to extirpate. In the forest it is a destructive epiphyte.

See—Medicinal Plants, Fodder Plants, Sacred Plants.

FICUS RETUSA Linn.

FAM.—Moraceæ.

COM. NS. :—*H.* Pinwal; *K.* Pilal, Pili-mara; *M.* Nandruk.

CHAR. :—A moderate-sized handsome shady evergreen tree, 9-12 m. high (sometimes more); girth 1·8-3·6 m., aerial roots usually few, sometimes absent (Cooke). Aerial roots often numerous (Talbot). All parts glabrous. Bark brown, fairly smooth. *L.*—5·7·5 cm. on a short petiole, oval or obovate, acute or short-acuminate, entire, coriaceous, lateral nerves numerous, not prominent; polished and shining. *Receptacle* globose, solitary or in pairs, axillary or from the scars of fallen leaves, sessile, size of a pea, yellowish or reddish when ripe.

DISTR. :—Throughout the State, commonly planted along roadsides. Eastern Himalayas from Kumaon to Bengal, Assam, S. India, Deccan Peninsula: Burma, Andamans.

DESCR. OF WOOD :—*Colour* light reddish-grey; with narrow wavy bands of soft tissue, alternating with broader bands of firm texture. *Pores* moderate-sized often sub-divided, scanty. *Med. rays* short, moderately broad. Moderately hard, light. *Wt.*—35 lbs. per c.ft. Wood is one of the best of the fig kind.

USES :—Wood used for fuel. Wood suitable for furniture. Fruit is one of the favourite foods of the large pigeon (*Carpophaga bicolor*) in the Coco Islands (Prain).

FICUS RUMPHII Blume.

FAM.—Moraceæ.

COM. NS. :—*H.* Gajjun, Cajna, Khabar, Pakar, Pipal; *M.* Ashla, Payar.

CHAR. :—A moderate-sized deciduous tree, at first usually epiphytic, 12-15 m. high; girth 2·1-1·2·4 m. Bark smooth, grey,

1.3 cm. thick. *L.*—sub-coriaceous, 7.5-15 × 5.9 cm., broadly ovate with long acumen, entire, subundulate margins, glabrous, shining, base broad, truncate. *Receptacles* sessile, in pairs, axillary or from old scars, globular, not depressed at the apex, smooth, 1.3 cm. in diameter when ripe; when young whitish with dark spots, when ripe nearly black. Basal bracts 3. *Fr. t.*—ripe May-June. Renews leaves in Mar. (Closely resembles *F. religiosa*).

DISTR. :—Western Ghats near Bombay, Matheran, Mahabaleshwar, Khandala common; Outer Himalayas, mountains of the Punjab, Northern and Western India, Madhya Bharat, Assam; Burma, Malay Peninsula. Alt. upto 1,500 m.

DESCR. OF WOOD :—*Colour* white; with alternating bands of loose and firm tissue of equal width. *Pores* oval, scanty, moderate-sized. *Med. rays* fine, uniform, equidistant. Very soft, spongy. *Wt.*—about 27 lbs. per c.ft.

USES :—Wood used in Cachar for charcoal for tea-manufacture. In Assam lac insect is reared on it (Mann.). The fruit is eaten and the leaves and branches used for cattle fodder and to feed elephants. The tree is generally epiphytic and is then very destructive to timber trees.

See—Fruit Trees, Fodder Plants.

FICUS TOMENTOSA Roxb.

FAM.—Moraceæ.

COM. NS. :—*E.* Donkey's Banyan; *K.* Kallu-goli, Kulgolu, Kullatti.

CHAR. :—A large shady tree, with thin aerial roots from the branches; young parts clothed with rusty-grey tomentum. *Bark* white, scaly. *L.*—crowded towards the ends of the branches, coriaceous, 5-12.5 × 2.5-7.5 cm., ovate or obovate, elliptic, bluntly apiculate, entire, dotted above, softly rusty-hairy beneath, base rounded or cordate. *Receptacles* sessile in pairs, axillary, pisiform, grey tomentose, .6-1 cm. in diameter, basal bracts 3. *Fr. t.*—ripe Mar.-Apr.

DISTR. :—Throughout the State, common near the sea-coast of the Konkan and N. Kanara on sandstone rocks near Badami in Bijapur district, Kanara-Yellapur, Karwar, Kala Nadi; drier parts of the Gangetic plain, Bihar, Madhya Bharat, Deccan Peninsula; Ceylon.

DESCR. OF WOOD :—*Colour* white; with alternate bands of soft pale and firm dark tissue, very regular and concentric. *Pores* moderate-sized to large, very scanty, often sub-divided. *Med. rays* fine, prominent equidistant. Moderately hard, light. *Wt.*—26 lbs. per c.ft.

USES :—Leaves and branches lopped for fodder near Badami.

See—Fodder Plants,

FICUS TSIELA Roxb.

FAM.—Moraceæ.

COM. NS. :—K. Bilibasri ; M. Pipri.

CHAR. :—A large spreading tree without aerial roots. All parts glabrous. *Bark* greenish-grey, smooth. *L.*—10-15×5-7·5 cm., broadly-ovate or elliptic-lanceolate, acute or obtusely cuspidate, margins entire ; base narrowed or rounded ; 3-nerved ; petiole 4-5 cm. long. *Receptacles* crowded towards the ends of branches, axillary or from leaf-scars, sessile, globose, about 1·3 cm. in diameter, smooth and purple when ripe. *Fr. t.*—Apr.-Oct.

DISTR. :—Throughout the State ; widely planted as a road-side or avenue tree, for which it is well adapted. Western Peninsula from the Konkan southwards. Madras, Bengal, Ceylon.

DESCR. OF WOOD :—*Colour* grey. *Pores* very scanty, large, conspicuous on a vertical section. *Med. rays* fine, equidistant. Soft to moderately hard, with alternate bands of soft and hard tissue. *Wt.*—34 lbs. per c.ft.

USES :—Roadside or avenue tree.

FICUS TSJAKELA Burm.

FAM.—Moraceæ.

COM. NS. :—M. Kel.

CHAR. :—A large glabrous deciduous tree without aerial roots, leafless for a time during the dry season. *Bark* rough, dark-coloured ; inner bark red. *L.*—very glossy above, coriaceous, 7·5-19 × 4-7·5 cm., ovate-oblong, shortly acuminate, with entire, slightly undulate margins, base broad, rounded or subtruncate. *Receptacles* in clusters of 2-6 on very short crowded tubercles, in the axils of the leaves and in the axils of the scars of fallen leaves, sessile, depressed globose, small, whitish-yellow, dotted when ripe ; basal bracts 3, broad, deeply 2-fid. *Fr. t.*—ripe Mar.-May.

DISTR. :—Throughout Konkan and N. Kanara. Common in moist forests, abundant in the forests near Yellapur, and generally on the ghats. Decan Peninsula ; Ceylon.

DESCR. OF WOOD :—*Colour* brown ; in alternate concentric rings of narrow dark loose tissue and broader pale, firmer tissue ; the dark layers very conspicuous on a vertical section. *Pores* large, very scanty, irregularly scattered. *Med. rays* fine, dark, wavy, not numerous. Soft. *Wt.*—30 lbs. per c.ft. (Ceylon).

USES :—Trees planted to shade coffee plants.

FLACOURTIA CATAPHRACTA Willd.

FAM.—Flacourtiaceæ.

COM. NS. :—H. Paniala, Talispatri ; K. Abblu, Talispatri ; M. Juggum, Jugguru.

CHAR. :—A small deciduous tree, 9-75 m. high, with a girth 9-1.5 m. The trunk armed with numerous large compound thorns; branches numerous, the young ones slightly pubescent, generally unarmed, except close to the trunk. *L.*—1.8-10.4 × 2.6-4.6 cm., ovate to oblong, lanceolate, acuminate at the apex, rounded or acute at the base, crenate-serrate, membranous, shining, green on both sides, glabrous. Racemes shortly tomentose or puberulous, 5-10 flowered, often arising from the lateral branchlets, a small cordate bract under each pedicel. *Fl.*—Male calyx 4-5 partite. Stamens inserted into a glandular convex disc. Female calyx of 4-6 spreading sepals, with annular-lobed disc surrounding the ovary. Styles 4-6, short, connate at the base; stigmas dilated, almost horse-shoe-shaped, or capitate. *Fr.*—berry, oblong or ovoid, size of a plum, bluish-black containing 10-14 compressed seeds. *Fl. t.*—Jan.-Feb. *Fr. t.*—May. Sheds its leaves in the hot season.

DISTR. :—Cultivated and wild in Konkan; South Kanara, Malabar; Sub-Himalayan tract from Dchra-Dun (damp forests) eastwards to Chota Nagpur, Bengal, Assam to Chittagong; Burma, Malacca, Singapore and the Malay Islands.

DESCR. OF WOOD :—*Colour* red or orange-red. Close-grained. *Pores* numerous, small, often sub-divided. *Med. rays* very numerous, fine, closely packed. Hard and brittle, heavy; takes a fine polish. *Wt.*—53 lbs. per c.ft.

USES :—Used for agricultural implements. The fruits are slightly acid and are eaten. *Talispati* of the Indian Materia Medica is composed of tender shoots and leaves and is much used in diarrhoea and general debility.

See—Fruit Trees.

FLACOURTIA INERMIS Roxb.

FAM.—Flacourtiaceæ.

COM. NS. :—*E.* Mauritius plum; *K.* Ubbolu; *M.* Kaki.

CHAR. :—An ornamental evergreen tree, 12-15 m. high, with 1.2-1.5 m. girth. Trunk short, unarmed. *L.*—10.4-20.8 × 5.2-9.14 cm., ovate or oblong-lanceolate, acute or acuminate at the apex; acute or rounded at the base, obtusely-serrate, thin, coriaceous, shining, glabrous. *Fl.*—hermaphrodite in fascicled racemes. Disc covered with fleshy, orange-red glands. Stigmas 4-8, 2-lobed, Ovary 5-celled, cells 2-ovuled. *Fr.*—berry size of a cherry, red, containing 8-10 flattened seeds. *Fl. t.*—hot season. Fruits ripen towards the end of rainy season.

DISTR. :—A native of the Malayan archipelago; introduced in various parts of this State; generally cultivated; also in South India: Sylhet, Singapore, Penang, Burma.

DESCR. OF WOOD :—*Colour* red-brown. Close-grained. Heavy and rather hard.

USES :—Fruit is rather acidic and is edible.

See—Fruit Trees.

FLACOURTIA MONTANA Grah.

FAM.—Flacourtiaceæ.

COM. NS.:—*K.* Han sampige ; *M.* Attak, Champer.

CHAR.:—A middle sized thorny tree. *Bark* thin, grey, smooth with or without lenticels, green-parenchyma well developed, flowering branches unarmed, softly pubescent. *L.*—13-18.2 × 5.2-9.14 cm., ovate or oblong-lanceolate, obtusely-acuminate, rounded or acute at the base, crenate, coriaceous, glabrous, shining above and hairy beneath. *Fl.*—male and female on separate trees, in fascicled densely-pubescent racemes. Disc of male glandular. *Fr.*—scarlet, size of a large cherry. *Fl. t.*—Jan.-Feb.

DISTR.:—Chats of Konkan ; North and South Kanara in ever-green forests.

DESCR. OF WOOD:—Wood with a satin-like lustre and foetid smell. *Pores* small, often in lines of 2-3 together, between the numerous and very fine and short med. rays. Strong and close-grained. *Wt.*—50 lbs. per c.ft.

USES:—Wood used for building purposes in N. Kanara. The fruit is edible with a pleasant acid taste when perfectly ripe and makes an excellent jelly.

See—Fruit Trees.

FLACOURTIA RAMONTCHI L'Herit.

FAM.—Flacourtiaceæ.

COM. NS.:—*G.* Kankod ; *H.* Bilangra, Kanju, Kattar ; *K.* Gajal, Mullettari, Hanumanth ; *M.* Bhekal, Kakas, Paker, Tambat.

CHAR.:—A small thorny deciduous tree, 6-7.5 m. high with a short trunk of 1.2-1.5 m. in girth ; armed, with acute axillary spines 2.6-5.2 cm. *Bark* grey, thin. *L.*—5.2-9.14 × 3.25-5.87 cm., ovate-oblong, ovate or suborbicular, serrate or crenate, glabrous and shining above. *Fl.*—greenish-yellow, in short racemes or panicles ; dioecious. Styles 5-11, very short, united at the base, radiate. *Fr.*—a drupe, dark-red or black, pulpy, roundish, about 1.34 cm. long, seeds 8-16, flat, compressed. *Fl. t.*—Nov.-Mar. *Fr. t.*—May-June. Sheds its leaves Jan.-Feb. ; new leaves Apr.-May. Three varieties of this species are found within the limits of the Bombay State.

Var. *sapida*—a small tree ; spines often branched, leaves usually small, glabrous, cuncate-obovate ; styles 5, distinct, reflexed and 2-divided at tips.

Var. *latifolia*—leaves coriaceous, large, broad, glabrous ; stigmas 3-4, sessile, longitudinally 2-grooved.

Var. *occidentalis*—a small tree, more or less covered with grey velvety tomentum ; style as in var. *sapida*.

DISTR.:—Common in the ghat jungles from Bombay southwards. North Kanara and S. M. Country jungles ; ascends to 1,110 m. in the Khandesh Satpuras ; common near the lakes at Toranmal (Akroni Mahal) ; Sub-Himalayan tracts from the Punjab eastwards,

Rajasthan, Bihar, Madhya Bharat, and the Peninsula ; mostly in dry open places and rocky hills. Burma, Ceylon.

DESCR. OF WOOD :—*Colour* red. Close and even-grained. *Pores* small in radial lines. *Med. rays*, fine, uniform, closely packed and somewhat wavy. Durable, hard, splits but does not warp ; takes a good polish without absorbing much polish. *Wt.*—53 lbs. per c.ft.

USES :—Used for posts and poles of huts, agricultural implements, combs and for turning. Fruit and leaves are eaten. The gum and powdered bark are used in Indian medicine. Branches are lopped for cattle fodder.

See—Medicinal Plants, Fruit Trees, Fodder Plants, Gums and Resins.

GARCINIA CAMBOGIA Desr.

FAM.—Guttiferæ.

COM. NS. :—K. Dharambe, Upagimara, Manthulli ; M. Vilaiti amlī.

CHAR. :—An ever-green middle-size tree. Grows to a considerable size in favourable places. *Bark* .67 cm. thick, grey, smooth, lenticillate, containing abundance of bright yellow gamboge. *L.*—5.2-15.6 × 1.34-3.96 cm., oblong, elliptic or lanceolate, acuminate, attenuated at the end, coriaceous, dark-green, shining above. *Fl.*—polygamous ; yellow, 2 cm. diam., hermaphrodite larger, terminal or axillary, solitary or in fascicles, sessile or pedicelled. Male fl. thickened towards the tip. Sepals with narrow membranous margins, outer sepals smaller. Petals twice as long as sepals, concave. Anthers numerous (12-20 or more), adnate to a short androphore ; cells dehiscing longitudinally, introrse. Female fl. staminodia surrounding the base of the ovary in several phalanges, each consisting of 2-3 sterile stamens. Ovary 6-10-celled ; stigma 6-10, free nearly to the base. *Fr.*—succulent, 6.54-7.8 cm. diam., ovate or oblong-ovoid, yellow or reddish, 6-10 furrowed ; furrows with angular edges ending about the middle ; the apex is flat, depressed, or nipple-shaped. Seeds 6-8, with pulpy aril. *Fl. t.*—Feb.-Mar. *Fr. t.*—June-July.

DISTR. :—Evergreen forests of the Western ghats from Kanara southwards, abundant in N. Kanara, Madras ; both the Peninsulas ; Eastern Himalayas, Eastern Bengal ; Burma, Penang and the Andaman Islands. Also cultivated in gardens.

DESCR. OF WOOD :—*Colour* gray, sometimes patched with red, shining. Close-grained. Concentric bands forming transverse bars very numerous, white and prominent. *Pores* small and very small, in short radial lines, between the closely packed, uniform, fine med. rays. Hard, smooth. *Wt.*—47 lbs. per c.ft.

USES :—Wood used for common furniture. The bark contains much semi-transparent yellow gum. Fruit is of a pleasant acid taste and is eaten ; The rind is acid and is said to be used as a substitute for tamarind in curries.

See—Fruit Trees, Gums and Resins.

GARCINIA INDICA Chois.

FAM.—Guttiferæ.

COM. NS. :—*E.* Wild-mangosteen; *G.* Kokam; *H.* Kokum; *K.* Murgal; *M.* Bhirand, Ratamba, Kokamb.

CHAR. :—A tall slender tree with drooping branches. *Bark* light brown, spiny, very thin, smooth. *L.*—8·5-4·8-13 cm., obovate or lanceolate, obtuse, acute or acuminate, dark green, red when young. *Fl.*—yellowish. *Male* in axillary and terminal fascicles on pedicels 2·6-4 cm. Sepals orbicular. Petals rather larger. Stamens 12-20, forming a short capitate column; anthers opening longitudinally. *Female* solitary and terminal on a thick peduncle. *Staminodes* arranged in 4 bundles. *Ovary* 4-8 celled; stigma usually 8-lobed. *Fr.*—deep-purple, globose, as large as a small orange, not furrowed, 4-8-seeded. *Fl. t.*—Nov.-Feb. *Fr. t.*—Apr.-May.

DISTR. :—Tropical rain forests; Western coasts and W. ghats; Matheran; common in S. Konkan and N. Kanara evergreen forests. Often planted in the gardens in Konkan; cultivated in Mauritius.

DESCR. OF WOOD :—*Colour* greyish-white. Many dark concentric lines, resembling annular rings, without or with very few pores; very numerous, narrow, wavy, anastomosing white bands, in which the few scanty moderate-sized pores appear. *Med. rays* moderately broad, white, regular. Hard, strong but easily attacked by insects. *Wt.*—45 lbs. per c.ft.

USES :—Fruit, purple with an agreeable acid flavour is edible. A solid fat called "Kokam butter", obtained from the seeds, is used for food and medicine. The juice is used as a mordant by the people who work in iron; a delicious syrup is made of it. The rind, dried in the sun, is sold as "Amsol"; it is used in curries to give them an acid flavour.

See—Fruit Trees, Oils. ककम ककम

GARCINIA SPICATA Hook. f.

FAM.—Guttiferæ.

COM. NS. :—*M.* Haldi.

CHAR. :—A beautiful middle-sized evergreen tree. *Bark* thick, smooth, olive-green or brownish, wrinkled in horizontal folds. *L.*—18-22 × 5-8 cm., rotundate, ovate, elliptic oblong or lanceolate, retuse, obtuse or more or less acuminate, shining. *Fl.*—white, small, male and female mixed; usually the females are fascicled, and the males arranged in spikes. *Male fl.* sepals usually 4, coriaceous, orbicular. Petals 4-5, concave, orbicular, twice the length of the sepals. Stamens in 5-fascicles; anthers 6-10 to each bundle. *Female fl.* usually on much longer pedicels than males. *Staminodes* 5, ovary round, 3-4-celled; stigma 5-lobed to the middle. *Fr.*—broadly oval, size of a *Kokam* fruit, with a smooth green rind, and full of yellow juice, 1-3-seeded. *Fl. t.*—cold season. *Fr. t.*—ripens in Mar.-Apr.

DISTR. :—Western ghats, Khandala, Parghat, Matheran, Konkan, Kanara; Malabar and Travancore in evergreen forests; Northern Circars and Carnatic; Ceylon in dry regions.

DESCR. OF WOOD :—*Colour* yellowish white; close-grained with numerous concentric white bands which are slightly wavy and occasionally broken. *Pores* scanty, moderate-sized. *Med. rays* fine, numerous, long, making a pretty silver grain. Hard, liable to split and crack. *Wt.*—59 lbs. per c.ft.

USES :—No valuable material can be expected from this tree.

GARCINIA XANTHOCHYMUS Hook. f.

FAM.—Guttiferæ.

COM. NS. :—*H.* Dampel; *K.* Divarige, Deavkai, Janagi; *M.* Jharambi.

CHAR. :—A medium sized beautiful evergreen tree 12-15 m. high, with girth of 9-1.5 m. *Bark* brown, inner bark white, .67 m. thick, without yellow glands, exfoliating in small round scales. Glabrous, trunk straight, branches drooping, sharply angled and often enlarged immediately below the axils of leaves. *L.*—23.47 × 5-10 cm., oblong-lanceolate, acute or shortly acuminate at the apex, more or less attenuated at the base, hardly coriaceous, shining green, glabrous; petiole enlarged near the insertion on the stem. *Fl.*—white, with a very slight tinge of yellow. *Male and hermaphrodite fl.* 2 cm. diam., in 4-8-flowered fascicles, from the axils of fallen leaves; sepals small, usually 5, orbicular, concave, unequal. Petals usually 5, larger, spreading. Stamens united in 5-phalanges of 3-5, alternating with 5-glands; no ovary. *Female fl.* solitary in the axils of fallen leaves; ovary ovoid, 5-6-celled, crowned with a large 5-6-lobed stigma. Fruit the size of an apple, subglobose or oval, yellow. Seeds 1-4; oblong. *Fl. t.*—hot season. *Fr. t.*—rainy season upto Jan.

DISTR. :—On the Bombay ghats; abundant in the evergreen forests of N. Kanara; Madras ghats. All over both the Peninsulas. Eastern Himalayas, Eastern Bengal. Burma, Penang and the Andaman Islands. Also cultivated in gardens.

DESCR. OF WOOD :—*Colour* dark grayish-brown. Close-grained, concentric bands thin, white, numerous. *Pores* very scanty, moderate-sized, scattered and unevenly distributed. *Med. rays* fine, white, numerous but irregular. Very hard, rather heavy, strong. *Wt.*—45 lbs. per c.ft.

USES :—The yellow gum is copious but useless as a gamboge. Fruit is acid. It is used after drying in the sun, when it is eaten in curries or used in medicine. The bark is used as a dye in Assam.

See—Fruit Trees, Gums and Resins.

GARDENIA GUMMIFERA Linn.

FAM.—Rubiaceæ.

COM. NS. :—Same as *Gardenia resinifera* Roth.

CHAR. :—A large, glabrous, unarmed shrub or a small deciduous tree, about 2 m. high. *Bark* greenish-brown, smooth; buds resinous. *L.*—4.7-5 cm., with 15-20 pairs of nerves, sessile, or sub-sessile, obovate-oblong, acute or obtuse, with cordate base, coriaceous,

shining, occasionally puberulous beneath. Stipules sheathing, truncate or mucronate. *Fl.*—sub-sessile, white, fragrant, terminal, 1-3-together. Corolla tube 4-5 cm., glabrous or pubescent; limb 4.5-7.5 cm. diam.: divisions 5, narrow, oblong, obtuse. *Fr.*—oblong, 2.5-4 cm., small, crowned with the persistent calyx; pericarp thin, crustaceous; endocarp 4-5-valved. *Fl. t.*—Feb.-June. *Fr. t.*—during the rains. Leafless during hot season.

DISTR. :—Open situations; Western Peninsula from the Satpuda range southwards. Common on laterite in S. M. Country and N. Kanara; Northern ghats of Madras State. Ceylon.

DESCR. OF WOOD :—*Colour* yellowish-white. Close-grained. *Pores* small. *Med. rays* moderately broad and a large number of very fine rays, which are not very distinct. *Wt.*—54 lbs. per c.ft. (one specimen).

USES :—The same as *G. resinifera* Roth.

GARDENIA LATIFOLIA Ait.

FAM.—Rubiaceæ.

COM. NS. :—*H.* Ban-pindalu, Papra, Paphar, Pepcro; *K.* Kalkambi; *M.* Ghogar, Gogarli, Papur, Pandru; *Tr.* Gardenia, Indian boxwood.

CHAR. :—A small deciduous tree with stiff divergent branches, forming a rounded head; 6-9 m. high; girth .9-1.2 m. *Bark* smooth, pale-grey, flaking off in small round pieces. *L.*—10-20 cm. and sometimes almost as broad, opposite or in threes, large, broadly-elliptic, ovate or orbicular, obtuse, narrowed into short petiole, glabrous or pubescent beneath; nerves about 12 pairs with hairy glands in the axils of the nerves beneath; stipules large, connate, often toothed. *Fl.*—terminal, generally solitary, sometimes binate, nearly sessile, white, soon changing to yellow, fragrant, calyx divisions 5-9, unequal, recurved. Corolla tube 5-7.5 cm., pubescent or hirsute on the outside, limb 5-11 cm. diam., lobes 5-9, obliquely-ovate. Stigma thick. *Fr.*—nearly globose, 2.5 cm. diam., greenish or greenish-yellow, crowned by the calyx limb, and leaving rounded depressions. *Fl. t.*—Mar.-May. *Fr. t.*—cold season. Leafless during the cold season; new leaves in May.

DISTR. :—Common in the dry forests of the State; S. M. Country—sandstone hills near Belgaum; Kanara—near Duddi; dry hilly districts of Madhya Bharat and South-Western India, Bihar, W. Bengal; Ceylon.

DESCR. OF WOOD :—*Colour* light yellowish-brown; handsomely mottled. Close and even-grained. No heart-wood. Marked concentric *an. rings*. *Pores* extremely small, numerous. *Med. rays* fine, short. Hard, tough, durable, seasons well, takes good polish, easy to work, exceptionally fine turnery wood, takes a beautiful fine finish. *Wt.*—51 lbs. per c.ft.

USES :—Wood used for combs, rulers, toys and turnery articles; possible substitute for boxwood for engraving. Leaf buds yield resin like other species, but in small quantities; leaves are fed to cattle.

See—Fodder Plants, Gums and Resins.

GARDENIA RESINIFERA Roth
(**GARDENIA LUCIDA Roxb.**)

FAM.—Rubiaceæ.

COM. NS. :—C. Cambi Resin Tree; *G.* Dikamali, Dikamari; *H.* Dikamali, Dikamari; *K.* Bikke, Dikamalli; *M.* Dikemali.

CHAR. :—A large glabrous, unarmed shrub or a small deciduous tree, about 5-7 m. high, girth .9 m., young shoots smooth, resinous. *Bark* .9 cm., thick, greenish-gray, exfoliating in irregular flakes. *L.*—7.5-25 × 5-13 cm., elliptic-oblong, obtuse or sub-acute, narrowed into short marginate petiole, shining, many-nerved, nerves 20-30 pairs; stipules large, connate. *Fl.* white, becoming yellow, solitary, fragrant, on 4 cm. pedicels from the axils of the uppermost leaves. Calyx variable. Corolla tube 4-5 cm., limb 4-7 diam.; divisions 5, oblong. *Fr.*—oblong or ovoid, smooth, crowned with the persistent calyx. *Fl. t.*—Mar.-June. *Fr. t.*—cold season.

DISTR. :—Dry deciduous forests from Konkan southwards; Deccan, S. M. Country, Kanara; Western Peninsula; all dry districts of Madras State; Burma.

DESCR. OF WOOD :—*Colour* yellowish-white; no heart-wood. Close grained. No *an. rings*. *Pores* extremely small. *Med. rays* very fine, very short. *Hard.* *Wt.*—51 lbs. per c.ft.

USES :—Wood used for combs and turning; possible substitute for boxwood for engraving. The tree gives gum from bark-wounds and leaf-buds which is used medicinally.

See—Medicinal Plants, Gums and Resins.

GARDENIA TURGIDA Roxb., Var. MONTANA Hook. f.

FAM.—Rubiaceæ.

COM. NS. :—*H.* Ghurga, Khuriari, Khurrur, Mhaner, Thanella; *K.* Bongari, Boodbagari, Boothbangari; *M.* Khurphendra, Pendri, Phanda, Phetra.

CHAR. :—A small deciduous tree, reaching 7.5 m. high. *Bark* smooth, thick, soft, that on the young branches yellowish; branches numerous, thick, stout, armed with strong, straight thorns. *L.*—5.9 × 4.5-5 cm., oblong or semi-orbicular, obtuse, glabrous above, velvety-tomentose beneath, base tapered. *Fl.*—from the young leafless shoots dimorphic, the males in fascicles, female solitary. *Male fl.*—calyx turbinate, pubescent, mouth wide, truncate; corolla lobes oblong, obtuse. *Female fl.*—calyx flask-shaped, mouth dilated; corolla as in the male. *Fr.*—2.5-7.5 cm. diam., ovoid, bluntly pointed, smooth, pericarp thick, endocarp woody, shining inside. *Fl. t.*—Apr.-June. *Fr. t.*—rainy and cold season.

DISTR. :—In dry forests throughout the State; common in Dharwar and N. Kanara jungles; Sub-Himalayan tract from Nepal to the Jumna, Southern and Western India, Madhya Bharat; Burma.

DESCR. OF WOOD :—*Colour* white with a purplish tinge. Close-grained. No heart-wood. *An. rings* visible but not distinct. *Pores* very small and numerous. *Med. rays* fine and very fine, distinct, numerous, smooth, hard, durable. *Wt.*—58 lbs. per c.ft.

USES :—Wood used for combs ; possible substitute for boxwood for engraving.

GARUGA PINNATA Roxb.

FAM.—Burseraceæ.

COM. NS. :—*H. Ghogar*, *Kaikar* ; *K. Aranelli*, *Balagi*, *Khandergai*, *Nellagodda*, *Sodikonne* ; *M. Kakad*, *Kangkar*, *Kudak*, *Kurak*.

CHAR. :—A large deciduous tree ; trunk strong, erect, 15-18 m. high, girth about 1.5-1.8 m. *Bark* 2.6 cm. thick, soft, red inside, gray or brown outside, exfoliating in large irregularly shaped flakes. *L.*—about 31 cm. long or more, alternate, imparipinnate, near ends of branches. *Leaflets* 13-19, 5.2-10.4 × 2.6-3.2 cm., nearly opposite, lanceolate or ovate-lanceolate, acuminate at the apex, unequal at the base, subsessile, crenate, glabrous or tomentose. *Fl.*—yellowish-white, in large compound pubescent panicles ; bracts deciduous. *Calyx* teeth 5, ovate, pubescent. *Petals* 5, linear, inserted at the throat of the calyx, between its teeth. *Stamens* 10, filaments, ovary and style hairy ; anthers versatile. *Fr.*—drupe, fleshy, smooth, size of a gooseberry, containing 1-5 one-seeded nuts. *Fl. t.*—Feb.-May. *Fr. t.*—rainy season. Sheds leaves in cold season ; new foliage early in hot season.

DISTR. :—Common in the Konkan and the Deccan hills ; throughout the dry forests of India from the Jumna to Burma and southwards to the Nilgiris ; Andamans and Cocos Islands.

DESCR. OF WOOD :—Wood variable. *Colour* sap-wood white, large ; heart-wood reddish-brown, hard and even-grained. *Pores* large, not numerous, often sub-divided, sometimes filled with resin. *Med. rays* short, moderately broad ; on a radial section visible as narrow horizontal plates and giving a pretty silver-grain. Soft ; readily attacked by insects ; seasons well, but not durable. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for inferior buildings (chiefly planking), dugout canoes, tea-boxes, and drums. Fruit is eaten both raw and pickled. Bark used for tanning. Leaves used as fodder. Tree gives a copious gum of no value. (This requires investigation).

See—Fruit Trees, Dyes and Tans, Gums and Resins, Fodder Plants.

GIRONNIERA RETICULATA Thw.

FAM.—Ulmaceæ.

COM. NS. :—No common names.

CHAR. :—A very large tree with buttresses at the base ; about 30 m. high, with 1.2 m. diameter. *Bark* grey, smooth, splitting into thin plates peeling from the bottom upwards ; inner bark reddish with white bast intermixed, very thin, fibrous, fibres long and

strong. *L.*—7.5-12.5 × 4.5-6 cm., ovate to ovate-oblong, acuminate or caudate, glabrous, smooth, shining, base rounded or acute. *Fl.*—axillary; male in short paniculately branched cymes; perianth segments 5; female solitary, sepals narrower than the male. *Fr.*—ovoid, hardly compressed, stoutly beaked, glabrous, about 1.8 cm. long. *Fl. t.*—Nov.-Jan. *Fr. t.*—hot season.

DISTR. :—In the evergreen forests near Sonda, Hoolikul, Sirsi and Siddapur sub-divisions of N. Kanara. Western Peninsula on the ghats from N. Kanara to Travancore.

DESCR. OF WOOD :—Not available.

USES :—Wood said to be valuable (Talbot). Beddome says the wood is hard and heavy and valuable for engineering; it is red-brown and used in Sikkim for planking, rafters, etc.

See—Fibres.

GIVOTIA ROTTLEIFORMIS Griff.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Bettitalai, Butala, Pulkeer; M. Polki.

CHAR. :—A middle-sized dioecious tree with stout branches. *Bark* brown, smooth, 1.3 cm. thick, peeling off in circular thick bosses, leaving pits; young shoots, inflorescence and under side of leaves densely grey-tomentose with stellate hairs. *L.*—10-15 × 8-15 cm., alternate, broadly ovate or rotundate, acute at the apex and a cordate base, sometimes slightly lobed and distantly crenate, glabrous by age, but grey tomentose beneath; petiole 7.5-12.5 cm., sometimes with 2-3 glands above the middle. *Fl.*—in axillary slender panicles, 15.5-25 cm., calyx, 5-cleft. Petals alternating with the sepals. Disc somewhat lobed, pubescent. Styles 2-cleft to the middle. *Fr.*—oblong, ellipsoid, fleshy, size of a pigeon's egg; seeds globose, pale-coloured. *Fl. t.*—hot season. *Fr. t.*—Sept.-Oct.

DISTR. :—Throughout the dry districts of the Deccan, abundant in the Belgaum district, near Sutgutti; in dry, deciduous, open jungles on the lower Cuddapah quartzite. Katraj ghat near Poona. Dharwar and Bellary southwards in the Deccan Peninsula, Ceylon.

DESCR. OF WOOD :—*Colour* white. Even-grained, *Pores* moderate-sized to large, very scanty, very prominent on a vertical section, often many times sub-divided. *An. ring* marked by a dark line. *Med. rays* numerous, uniform, fine, the distance between the rays much less than the transverse diameter of the pores. Occasional faint light bars joining the rays. Exceedingly light, very soft takes paint very well. *Wt.*—17 lbs. per c.ft.

USES :—Wood used for oars, catamarans, carved figures, toys, imitation fruits, theatrical masks, and other fancy articles, which are lacquered and painted. Seeds yield oil used for lubricating machinery.

See—Oils.

GLOCHIDION ELLIPTICUM Wight.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Nirchalli ; M. Bhoma.

CHAR. :—A middle-sized evergreen tree quite glabrous. *Bark* brown or gray, soft, cleft longitudinally. *L.*—6.3-15 × 2.5-4.5 cm., elliptic, lanceolate, acutely or obtusely acuminate, base acute. *Male fl.*—greenish-yellow on capillary pedicels reaching 1.3 cm. Calyx partite to the base ; sepals fleshy, oblong, rounded at the apex, anthers 3. *Female fl.*—few, sessile, in small clusters, deeper yellow than the male. Calyx cup-shaped with 4-6 irregular teeth. *Fr.*—capsule about 1 cm. diameter, sessile, turnip-shaped, 6-8 lobed, much depressed in the centre, crowned by the style in the sunk-top. Seeds red, 2 in each cell, rounded at the back, quite smooth. *Fl. t.*—Dec.-Apr. *Fr. t.*—Apr.-May.

DISTR. :—On the Konkan and N. Kanara ghats, in evergreen forests. Common in the forests near the Nilkund and Gairsappa ghats ; Matheran, Mahabaleshwar, Khandala, Phonda ghat ; Western Peninsula.

DESCR. OF WOOD :—*Colour* reddish-brown. *Pores* small and moderate-sized, scanty, in radial lines between the fine *med. rays*. Moderately hard. A pretty wood. *Wt.*—about 56 lbs. per c.ft. (Orissa).

USES :—Not known.

GLOCHIDION JOHNSTONEI Hook. f.

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A small tree, 9 to 12 m. high, with .45 m. diameter. *Bark* dark-coloured, rough, fissured ; branchlets terete, tomentose. *L.*—9-13 × 4-4.5 cm., oblong or elliptic-oblong, obtuse, glabrous above, pubescent on the nerves beneath, base sub-equal. *Fl.*—in axillary clusters, males on filiform pedicels and females sessile ; male flowers, sepals 5 or 6, subequal, hairy outside, fleshy ; female flowers sessile ; calyx hairy outside, 4-6-toothed, or lobed. *Fr.*—capsule, small, depressed globose, slightly 3-lobed, crowned with style tips. *Fl. t.*—Feb. *Fr. t.*—Apr.

DISTR. :—Konkan and N. Kanara. Common on the Supa Ghats of N. Kanara near Anmode, also on the Arbail ghat. Western Peninsula. Cochin.

DESCR. OF WOOD :—*Colour* reddish-grey. *An. rings* visible. *Pores* small, equally distributed. *Med. rays* moderately broad. Soft. *Wt.*—about 40 lbs. per c.ft.

USES :—Not known,

GLOCHIDION VELUTINUM Wight.

FAM.—Euphorbiaceæ.

COM. NS. :—*H. Parwi* ; *K. Salai-mara* ; *M. Paritza*, Showra.

CHAR. :—A small tree, 7·5-9 m. high ; young branches and other parts clothed with short velvety pubescence. *Bark* brown, rough. *L.*—thinly coriaceous, $5\cdot4 \times 2\cdot8$ - $5\cdot6$ cm., elliptic-oblong or lanceolate, acute, obtuse or shortly acuminate, base usually acute. *Fl.*—in axillary clusters, the males and females together. Male flowers on slender, pubescent pedicels. Female generally sessile. *Fr.*—capsules, 1·3 cm. in diameter, orbicular, depressed, 4-7-celled and 4-7-lobed, often leaving the bright red seeds on the tree. *Fl. t.*—Dec.-Mar. *Fr. t.*—Mar.-June.

DISTR. :—Throughout the deciduous forests of the Konkan and N. Kanara ghats ; common in the Supa taluka dry forests. Hot valleys of the Himalayas from Kashmir eastwards to Burma. Western Peninsula—Nilgiris.

DESCR. OF WOOD :—*Colour* dark-red when seasoned and old, lighter when young and freshly cut. *Pores* moderate-sized, rather scanty, often sub-divided. *Med. rays* moderately broad, equidistant, giving a nice silver-grain. Hard, rough. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for fuel. The bark is said to be used for tanning. The leaves are not eaten by goats.

See—Dyes and Tans.

GLOCHIDION ZEYLANICUM A. Juss, Var. NITIDUM Hook. f.

FAM.—Euphorbiaceæ.

COM. NS. :—*K. Savre-gida*.

CHAR. :—A small, nearly glabrous tree ; stem 30 cm. in diameter. *Bark* thin, grey, corky with numerous narrow fissures. *L.*— $9\cdot18 \times 4\cdot5$ - 6 cm., oblong, obtuse or bluntly acuminate, bright apple-green and shining above, paler beneath, base unequal-sided, usually rounded. *Fl.*—shortly pedicellate, the male and female together in umbellate clusters, on supra-axillary peduncles, the females more numerous. Sepals 5-6, similar in both sexes. *Fr.*—capsule, $\cdot9$ - $1\cdot8$ cm. in diameter, subglobose, obscurely lobed. *Fl. t.*—Oct.-June (Cooke). Flowers and fruits at different times throughout the year (Talbot).

DISTR. :—Common on the Konkan and N. Kanara ghats, along streams and water-courses, both in evergreen and deciduous forests. Western Peninsula, Assam, Silhet : Ceylon, Malay Peninsula.

DESCR. OF WOOD :—*Colour* dull-red. Even-grained. *An. rings* visible. *Pores* small, equally distributed. *Med. rays* moderately broad. Smooth, moderately hard. *Wt.*—42 lbs. per c.ft.

USES :—Not available,

GMELINA ARBOREA Roxb.

FAM.—Verbenaceæ.

COM. NS. :—*E.* Kashmiri Tree, Comb Teak, White Teak ; *G.* Savan, Shivan ; *H.* Gambhari, Gumbhar, Shiwan ; *K.* Bachanige, Gupsi, Kumbudi, Shiwani ; *M.* Shiwan ; *Tr.* Guman.

CHAR. :—A moderate-sized unarmed deciduous tree, 15-18 m. high ; girth 1.8-3.6 m. Branchlets and young parts clothed with fine mealy pubescence. *Bark* smooth, greyish-yellow, corky ; inner bark mottled, yellow, turning quickly brown on exposure to air. Young parts pubescent. *L.*—10-20 × 7.5-15 cm., ovate-acuminate or acute at the apex, rounded or cordate at the base, tawny-tomentose beneath while young, entire, almost coriaceous on a petiole 5-7.5 cm. long. *Fl.*—yellow tinged with brown, 2.5 cm. long, on short yellowish pedicels in small cymes, forming raceme-like tomentose, terminal and axillary panicles. Inflorescence, calyx and corolla densely tawny-tomentose. Corolla 5-lobed, bilabiate. *Fr.*—drupe, 2.5 cm., ovoid or obovate, fleshy, smooth, yellow when ripe. *Fl. t.*—Mar.-Apr. *Fr. t.*—May-June. Sheds leaves Feb.-Apr. ; new foliage—Apr.-May.

DISTR. :—Throughout the State in deciduous monsoon forests. Common in the Satpudas, Khandesh, Dangs, Kanara. Throughout India, Sind, Ceylon, Malaya, Philippines.

DESCR. OF WOOD :—*Colour* yellowish, greyish or reddish-white, with a glossy lustre. Even-grained. *An. rings* marked either by white lines or by more numerous pores in the spring wood. *Pores* large and moderate-sized, often sub-divided, rather prominent, on a vertical section ; sometimes arranged in rough, more or less concentric lines. *Med. rays* short, moderately broad, prominent, visible in the silver-grain as irregular horizontal bands. Soft, light, strong, durable, does not warp or crack, easy to air-season and kiln-dry. Green conversion and open stacking with crossbars under cover will give the best results ; easy to saw and work to a good finish ; takes paint or polish extremely well ; usually very uniform in colour and character ; regarded as a first class workshop wood. It is not very ornamental but is an extremely "steady" wood. *Wt.*—36 lbs. per c.ft.

USES :—Wood used for planking, door-panels, furniture and cabinet-work, carriages, palanquins, ploughs, sluice-valves, well-construction, drums (a favourite wood), grain-measures, dug-out canoes, knees and thwarts of boats, oars, cooper's work, gunstocks, interior panelling and lining of railway carriages, boxes and packing-cases, combs, toys, carved images, picture-frames, sounding-boards of musical instruments ; pronounced very good for match manufacture ; makes fairly good unbleached wood pulp. Root, leaves, flowers and fruits used medicinally. Fruit is eaten by poor classes in Satpudas and also by cattle.

See—Medicinal Plants, Fruit Trees,

GOMPHANDRA AXILLARIS Wall.

FAM.—Icacinaceæ.

COM. NS. :—No common names.

CHAR. :—A small tree. Diccious or polygamous; glabrous, or the young branches slightly puberulous. *L.*—6·5-14·3 × 2·5-6·5 cm., alternate, membranous, conspicuously veined, variable in shape, from narrow-lanceolate to almost orbicular, terminating in a long acumination. *Fl.*—cymes, puberulous, axillary, short, solitary or twins, many-flowered in the male; 2-5-flowered in the female. Calyx minute, 4-5-toothed. Petals 4-5, united at the base into a tubular, campanulate corolla. Stamens 5, filaments flat, hollowed in front to contain anthers, hairy at the apex. Ovary 1-celled, oblong, smooth. *Fr.*—1·3 cm. long, oblong, obtuse, smooth. Seeds large. *Fl. t.*—Apr.-May. *Fr. t.*—Nov.-Dec.

DISTR. :—Western Peninsula from the Konkan southwards; common in the evergreen rainy forests of the Konkan and N. Kanara ghats (Chorla and Parua ghats) : Ceylon.

DESCR. OF WOOD :—*Colour* grey. *Pores* small, scanty. *Med. rays* broad, white, showing a good silver grain. Very many, fine white, irregular and wavy transverse bars. Soft. *Wt.*—30 lbs. per c.ft.

USES :—Not known.

GONIOTHALAMUS CARDIOPETALUS H. f. & T.

FAM.—Anonaceæ.

COM. NS. :—No common names.

CHAR. :—A large shrub or a small tree. Branches slender, leafy. *L.*—15·6-23·4 × 5·2-7·8 cm., aromatic, linear, oblong, abruptly-acuminate at the apex; acute at the base, thin, coriaceous, undulated at the margin. *Fl.*—2·6 cm. diam., reddish, on supra-axillary, solitary or superposed peduncles. Sepals small, pubescent, broadly-ovate; outer petals cucullate-clawed, ovate-lanceolate, 8 lines long, densely brown, tomentose, inner ones 1/3 shorter, tomentose. Stamens many. Carpels many. Styles slender, 2-fid; berries 1-seeded. *Fl. t.*—Mar. *Fr. t.*—rainy and cold season.

DISTR. :—S. M. Country, evergreen forests of the Western ghats from North Kanara to Malabar. Apparently endemic in Southern India.

DESCR. OF WOOD :—Not available.

USES :—Used for posts.

GORDONIA OBTUSA Wall.

FAM.—Ternstroemiaceæ.

COM. NS. :—No common names.

CHAR. :—A tall glabrous evergreen tree. *Bark* brown, smooth. *L.*—5·2-10·4 × 2·6-4 cm., narrow-elliptic or lanceolate, obtuse or with a blunt acumination, tapering at the base, crenate, glabrous,

short-petioled. *Fl.*—4 cm. diam., white, solitary, on peduncles a little shorter than the petioles. Sepals generally 5, orbicular, silky-pubescent externally. Petals generally 5, obcordate, slightly united at the base, slightly silky-pubescent on the outside. Stamens numerous, somewhat pentadelphous. Anthers versatile. Ovary 3, usually 5-celled. Style single; stigma large. *Fr.*—capsule 2.6 cm. long, 5-angled. Seeds flattish, oblique. *Fl. t.*—June-Sept. Very pretty in flowers.

DISTR. :—Western ghats from the Konkan southwards. Quite common in the dry “Sholas” on the eastern side of the Nilagiris. *Alt.*—750-2250 m.

DESCR. OF WOOD :—*Colour* pinkish-white to reddish-brown. Even-grained. *Pores* small, very numerous, uniformly arranged between the fine, short, very numerous *med. rays*, the distance between which is equal to the transverse diameter of the pores. *An. rings* faintly marked by a line, silver grain good and pretty. Easy to work, is liable to warp. *Wt.*—40-45 lbs. per c.ft.

USES :—Wood occasionally used for buildings. Generally used for planks, rafters and beams.

GREVIA ASIATICA Linn.

FAM.—Tiliaceæ.

COM. NS. :—*H.* Dhamin, Karra, Pharsa; *K.* Butu-Udipi, Jani, Tadsal; *M.* Phalsa.

CHAR. :—A small tree, trunk short, about 6 m. high, girth .9-1.5 m. *Bark* grey, rough, .67-1.34 cm. thick. Shoots, underside of leaves, and inflorescence covered with soft, yellowish tomentum. *L.*—5.2-18.2 × 7.8-10.4 cm., obliquely cordate or broad-ovate, rotundate, acuminate, 5-7-nerved, irregularly toothed, glabrescent above; petiole tomentose, enlarged at the top. Stipules linear-lanceolate, subulate, nearly as long as the petiole, often with a broad, oblique base. Peduncles axillary, 2-7-together, usually shorter, sometimes longer than the petioles, bearing from 3-5-flowers on bracteate, puberulous pedicels. *Fl.*—yellow, sepals oblong-lanceolate, reddish-brown or yellow internally. Petals linear-oblong, obtuse or emarginate, half the length of the sepals, with a small, foveolate, villous or fringed scale at the base. Stamens numerous, all fertile, free and inserted on a raised glandular torus; filaments red. Ovary densely villous. *Fr.*—drupe, the size and shape of a pea, dark-brown, indistinctly lobed with 1 or 2 one-seeded stones. *Fl. t.*—Mar. *Fr. t.*—Apr.-May. Sheds leaves in cold season; new foliage about end of Mar.

DISTR. :—Indigenous in Poona district forests; generally cultivated for its fruits in India. Sub-Himalayan tract from the Indus eastwards, Madhya Bharat, S. India, Rajasthan, Bengal; Burma; Ceylon.

DESCR. OF WOOD :—*Colour* pinkish or yellowish-white. Close-grained. *Pores* moderate-sized, sometimes sub-divided, scanty, unevenly distributed. *Med. rays* numerous, moderately broad, causing a marked silver-grain on a radial section. Strong, elastic, hard. *Wt.*—48 lbs. per c.ft.

USES :—Fruit edible. Bark mucilage is used for clarifying sugar. Inner bark used for rope-making.

See—Fibres, Fodder Plants, Fruit Trees.

GREWIA TILIÆFOLIA Vahl.

FAM.—Tiliaceæ.

COM. NS. :—*G.* Dhamana ; *H.* Dhamin, Phalsa, Pharsa ; *K.* Butalc, Dadsal, Jani, Taddasū ; *M.* Daman, Dhamani.

CHAR. :—A moderate-sized tree, with an erect, tolerably straight trunk, 9-12 m. high ; girth 1·2-1·8 m. *Bark* grey on young trees, dark brown on old ones. Young shoots pubescent with minute stellate hairs. *L.*—10·4 × 5·2 cm., ovate or roundish ; acuminate, obliquely cordate, 3-5-nerved at the base, bluntly toothed or serrate, coriaceous, sparingly minutely stellate, hairy or glabrescent above, hoary pubescent beneath. Petiole pubescent or glabrescent. Stipules broad-lanceolate, leafy, falcate, auricled, caducous. Inflorescence axillary, 2-3 together (sometimes numerous), equal to or a little longer than the petioles, 3-5-flowered. Pedicels small, pubescent, furnished with bracts. *Fl.*—yellow. Sepals tawny-velvety outside, glabrous inside. Petals emarginate, linear-oblong, half the length of the sepals, with a fringed foveolate scale at the base of each. Stamens numerous, all fertile, free from the base, and inserted upon a raised blabrous torus. Anthers small, 2-celled. Ovary 4-celled, hirsute. Style about twice as long as the stamens ; stigma 4-lobed. *Fr.*—drupe, globose, size of a pea, glabrescent, bluish-black when ripe, 2-(rarely) 4-lobed. *Fl. t.*—Mar.-May. *Fr. t.*—June-Oct. Sheds leaves in Mar. ; new leaves in Apr.

DISTR. :—Throughout the deciduous forests of the Bombay State ; common in N. Kanara ; Sub-Himalayan region from the Jumna to Nepal, Madhya Bharat, S. India, Madhya Pradesh : Burma and Ceylon.

DESCR. OF WOOD :—*Colour*—sap-wood white, heart-wood small, brown. Close-grained. *An. rings* marked by a line and the harder autumn wood. *Pores* moderate-sized, numerous, uniformly distributed. *Med. rays* fine, prominent on a radial section, giving a handsome silver-grain ; the distance between the rays equal to the transverse diameter of the pores. Light, moderately hard, tough, elastic ; takes a good polish without absorbing much polish ; easily worked. *Wt.*—about 48 lbs. per c.ft.

USES :—Wood used for boats, masts, oars, ploughs, harrows, bows, shoulder-poles, handles of hoes and axes, house posts, door and window-frames, bedsteads and other furniture, carts, golf clubs, cooper's work including oil-casks ; has been tried for beer casks with excellent results. It would supplant English oak for casks, if supplied in large quantities. Young twigs and leaves good fodder for cattle. Inner bark yields a fibre for cordage. Acid flavoured fruits are eaten.

See—Fibres, Fodder Plants, Fruit Trees.

GUAZUMA TOMENTOSA Kunth.

FAM.—Sterculiaceæ.

COM. NS. :—*E. Bastard-cedar* ; *M. Rudrakshi*.

CHAR. :—A small evergreen tree, 9-18 m. high ; girth, 6-1.5 m., young parts shortly stellate-tomentose. *Bark* brown, rough. *L.*—7.8-11.8 × 5.2 cm., obliquely-ovate or oblong-lanceolate, acuminate at the apex, unequally cordate at the base, irregularly serrate, scabrous or glabrescent above, pubescent or tomentose beneath. *Fl.*—numerous, small, yellow, or dark-purple in terminal and axillary cymose panicles. Sepals 5, connate below the middle. Petals 5, sub-ungulate and concave at the base, produced at the apex into 2 linear ligulate processes. Stamens 10, united in a column, tubular at the base, and terminated above by 5 fertile, 3 antheriferous filaments, and 5 lanceolate staminodes. Anthers 2-celled ; cells diverging. Ovary sessile, 5-lobed, 5-celled. Styles 5, more or less connate ; stigma simple. *Fr.*—capsule, woody, indehiscent, oblong or sub-globose, 2.6 cm. long, tubercled, black, many-seeded. *Fl. t.*—July-Aug. *Fr. t.*—cold season.

DISTR. :—Cultivated in gardens throughout the State ; common about Bombay.

DESCR. OF WOOD :—*Colour* white or yellowish-white or light brown. Even-grained. *An. rings* faintly marked. *Pores* moderate-sized, fairly numerous, often sub-divided. *Med. rays* moderately broad to broad, not numerous, conspicuous in the silver-grain on a radial section. Soft, rather light ; takes a good polish. *Wt.*—about 39 lbs. per c.ft.

USES :—Wood used for furniture, panels of coaches, packing cases, etc. Leaves excellent fodder for cattle. Bark mucilage is used to clarify sugar in W. Indies ; also said to be used medicinally in elephantiasis and leprosy.

See—Fodder Plants.

GYROCARPUS AMERICANUS Jacq.

FAM.—Hernandiaceæ.

COM. NS. :—*H. Zaitun* ; *K. Poliki*, *Vende*.

CHAR. :—A middle-sized deciduous tree, 12-18 m. high ; girth 1.2-2.4 m. *Bark* greenish-white, smooth, shining. Young branches stout, marked with leaf-scars. *L.*—10-13 cm. long, and almost as broad, broadly-ovate, entire or slightly lobed, acuminate at the apex, truncate or cordate at the base, rarely pubescent ; clustered at the end of the branches ; those of the young plants are larger, often 20-25 cm., distinctly 3-lobed ; petiole 2.5-10 cm. *Fl.*—small, greenish-yellow, unisexual, arranged in dense axillary cymes ; peduncles 1-4, chiefly in the upper axils. *Fr.*—drupe, 1.3-2 cm., ovoid, crowned with the elongate wing like spatulate, calyx lobes 5-6.5 cm. *Fl. t.*—July-Sept. *Fr. t.*—Nov.-Feb.

DISTR. :—Deccan ; banks of the Krishna near Nalutwar ; S. M. Country, Belgaum district in dry forests ; Orissa, South India ; Ceylon, Malaya, Andamans.

DESCR. OF WOOD :—*Colour* grey. *Pores* large and moderate-sized, scanty, often sub-divided, uniformly distributed, well marked on a longitudinal section. *Med. rays* very short, moderately broad; the distance between them greater than the transverse diameter of the pores. A well marked silver-grain. Soft, light. *Wt.*—22 lbs. per c.ft.

USES :—Wood used for catamarans (preferred above all other woods for this), furniture, paddles, boxes, carved toys and models. Seeds are made into rosaries and necklaces.

HARDWICKIA BINATA Roxb.

FAM.—Cæsalpiniaceæ.

COM. NS. :—*H.* Anjan ; *K.* Kamra, Karachi ; *M.* Anjan ; *Tr.* Anjan.

CHAR. :—A deciduous tree ; tap-root upto 2·4 m. long, trunk straight, 15-18 m. high, occasionally 30-36 m. *Bark* thick, dark-grey, rough with irregular vertical cracks, exfoliating in narrow flakes. *L.*—abruptly pinnate, leaflets 2, sessile, oblique, ovate-trapezoid, entire, obtuse, 2·5-7·5 cm. long with 4-5 veins radiating from the base. Stipules small, caducous. *Fl.*—greenish-yellow, on long terminal and axillary paniced racemes. Pedicels as long as the calyx. Sepals oblong obtuse, petals 0. Stamens 10. Ovary oblong, sessile ; stigma capitate. *Fr.*—pod, thin, dry, lanceolate, 5-7 cm. long, dry, with 1 seed at the top. *Fl. t.*—cold season. *Fr. t.*—Apr.-May.

DISTR. :—In the dry forests of the State ; a gregarious tree but very local, common on the trap of the Satpudas in Khandesh, also in the Belgaum district. There is a small forest of this in Ranebennur taluka of Dharwar. Nemad in Madhya Bharat, Southern India, Berars, Chanda, Banda dist. of U. P. : Tropical Agricra.

DESCR. OF WOOD :—*Colour*—sap-wood small, white ; heart-wood dark-red streaked with black, often with a purplish tinge, cross and close-grained. *Pores* moderate-sized, often sub-divided, filled with resin, uniformly distributed. *Med. rays* fine, numerous, undulating, bent where they touch the pores, visible on a radial section as fine plates, giving a pretty silver-grain, occasionally scanty, fine, concentric lines. Extremely hard, perhaps the hardest and heaviest wood in India ; fairly strong and refractory wood to season, develops surface cracks when drying ; liable to warp if not well piled ; naturally durable against rot and white ants. Extremely difficult to saw and work ; should be converted green. *Wt.*—82 lbs. per c.ft.

USES :—Wood used for house and bridge beams, posts, rafters, carts and their parts, agricultural implements, well-construction, hand-looms, carving, turning and ornamental work, bearings of machinery, railway sleepers ; might be suitable for paving blocks, Tree is much lopped off both for fodder (best fodder for cattle) and manure. Inner bark gives fibre—used for cordage.

See—Fibres, Medicinal Plants.

HEMICYCLIA SEPIARIA W. & A.

FAM.—Euphorbiaceæ.

COM. NS. :—K. Hecra, Hira.

CHAR. :—A large branching evergreen shrub or a small tree, 2-3 m. high. *Bark* grey, thin, smooth. *L.*—4.5×2.4.5 cm., elliptic-ovate or obovate-obtuse or retuse, coriaceous, entire or repand-denticulate. *Fl.*—numerous, whitish, minute; male 7-11-androus around a flat disc; no rudiment of an ovary; sepals 4, concave, pubescent outside; female sub-sessile. Ovary crowned with 2-sessile stigmas. *Fr.*—drupe, red, globose, one-seeded, endocarp bony.

DISTR. :—From the Konkan southwards ascending to 900 m. in N. Kanara. Mountains on the east side of Madras, Cuddapah, Salem : Ceylon.

DESCR. OF WOOD :—*Colour* white, with a greyish-brown heart-wood. Close and even-grained, resembling boxwood. *Pores* small, very scanty, unevenly distributed. *Med. rays* fine, regular, very numerous. Numerous minute, fine, pale, ladder-like bars joining the rays as in Putranjiva. Very hard. *Wt.*—62 lbs. per c.ft.

USES :—A possible substitute for boxwood for engraving; used for turning and axe handles.

HERITIERA LITTORALIS Dryand.

FAM.—Sterculiaceæ.

COM. NS. :—M. Sundri-chand; Tr. Sundri.

CHAR. :—A gregarious evergreen tree, 6-9 m. high; girth 1.2-1.5 m. *Bark* dark-grey with longitudinal cracks. All young parts silvery-scaly. *L.*—13.20.8×5.2.10.4 cm., alternate, oblong-lanceolate or ovate, rounded or subcordate at the base, entire, coriaceous, glabrous above, densely silvery lepidote beneath. *Petiole* 1.3-2.6 cm. *Stipules* lanceolate, caducous. *Fl.*—monœcious, red, small, numerous, in loose tomentose panicles in the upper axils or above the scars of the fallen leaves. *Calyx* campanulate, urceolate, 5-toothed. *Corolla* 0. *Staminal column* in the male, slender, bearing below the summit a ring of 5 anthers, with 2 parallel cells. *Carpels* 5 nearly distinct. *Style* short; stigmas 5. *Fr.*—carpel, sessile, ovoid, woody, indehiscent, smooth or tubercled, brown, 2.6-10.4 cm. long, with a slight projecting inner edge and a strong almost winged keel along the outer edge. *Fl. t.*—rainy season. *Fr. t.*—end of hot season.

DISTR. :—Along the banks of the Kalinadi and near the coast at Karwar. Tropical coasts of the old world; along the coasts and tidal rivers of the E. & W. Peninsula, Bengal; Burma, the Andamans and Coos Islands.

DESCR. OF WOOD :—*Colour*—sap-wood pale; heart-wood dark-red. *Pores* moderate-sized to large, often oval and sub-divided into compartments. *Med. rays* uniform, moderately broad, short, wavy;

distance between two rays being generally equal to the transverse diameter of the pores. Occasional transverse bars; rather open-grained. Hard and not very durable; not easily worked. *Wt.*—65 lbs. per c.ft.

USES :—Its greatest use is for fuel; Employed for boat-building, carriage, cart timber, well-construction, packing cases, etc. but not in great demand.

HETEROPHRAGMA ADENOPHYLLUM Seem.

FAM.—Bignoniaceæ.

COM. NS. :—No common names.

CHAR. :—A large deciduous tree, 9-15 m. high, with large leaves. Young shoots and inflorescence brown, tomentose; leaflets 2-3-pairs, elliptic, entire, softly pubescent beneath, nearly sessile, 15-30 cm. long, often a pair of small auricle-like leaflets on the petiole at its base. *Fl.*—small, yellow-brown, in many-fld, terminal, erect, brown-tomentose panicles. Calyx campanulate, irregularly 3-5-lobed. Corolla densely brown-tomentose outside, 5 cm., across. *Fr.*—capsule, twisted, cylindric, ribbed. *Fl. t.*—Apr.-May.

DISTR. :—More or less cultivated in gardens in the State and India. (Birdwood mentions having found a tree near Chauk near Matheran, which was no doubt planted). Native of Burma and the Andamans, Assam, Chittagong; Coco Islands common.

DESCR. OF WOOD :—*Colour*—sap-wood light-yellow; heart-wood orange-yellow, with occasional darker streaks. *Pores* moderate-sized, ringed, filled with yellow resinous matter, uniformly distributed, but occasionally running into more or less concentric lines. *Med. rays* fine to moderately broad, the distance between them equal to or greater than the diameter of the pores, giving a good silver grain. Moderately hard to hard; does not warp or split. *Wt.*—52 lbs. per c.ft. (Andaman specimen). 42 lbs. per c.ft. (Burma specimen).

USES :—Wood excellent for cabinet-work. The wood well deserves being better known and becoming possibly, if the tree is sufficiently common, an export timber (Gamble).

HETEROPHRAGMA QUADRILOCULARE Schum.

(HETEROPHRAGMA ROXBURGHII, DC.)

FAM.—Bignoniaceæ.

COM. NS. :—*K.* Adwinuggi; *M.* Pullunga, Wurus.

CHAR. :—A large tree. *Bark* 1.3 cm. thick, dark-brown, exfoliating in small angular scales. *L.*—3-6 m. long, imparipinnate, opposite, glabrous when old; leaflets 5.5-3 × 4 cm.; 3-5 pairs, ovate, acute, serrate, short-petioled. *Fl.*—whitish with a pink margin, fragrant, in large terminal, many-flowered, erect panicles. Calyx bilabiate. Corolla campanulate. *Fr.*—capsule, 20 × 30 cm., 1.3 cm. thick, 4-celled. *Fl. t.*—Feb.-Apr. *Fr. t.*—May onwards.

DISTR. :—Throughout the State in deciduous forests; very common in the ghats, Khandesh, Matheran, S. M. Country, Konkan, Kanara. West Deccan Peninsula from Bombay southwards. Madhya Bharat, Godavari Forests.

DESCR. OF WOOD :—*Colour* grey; no heart-wood. No *an. rings*. *Pores* moderate-sized, uniformly distributed. *Med. rays* fine, visible on a radial section as long narrow plates. Strong, rough, moderately hard. *Wt.*—40 lbs. per c.ft. (one specimen).

USES :—The timber is not much used in the State; used for building purposes, planks and toys. Leaves are much eaten by cattle.

See—Fodder Plants.

HEYNEA TRIJUGA Roxb.

FAM.—Meliaceæ.

COM. NS. :—K. Doddali, Kora, Kuriya, Maddu, Tural; M. Gundira, Limbara.

CHAR. :—A very ornamental small tree, trunk erect generally, 9 m. high, and girth 1.5 m. *Bark* thin, rough, reddish-brown, with lozenge-shaped depressed lenticels. *L.*—10.4-41.5 cm. Leaflets 5-11, 5.1-17 × 2.8 cm., opposite, ovate-oblong, acuminate, glabrous above, and whitish, glabrescent or pubescent beneath, on short petiolules, the terminal ones longer. *Fl.*—white, small, numerous, in panicles nearly equalling the leaves. Bracts small, caducous. Calyx 5-cleft, pubescent or sub-glabrous. Petals 5, linear-oblong, puberulent. Staminal tube covered with pubescence both internally and externally. Anthers 10, on very short filaments, between two subulate teeth, nearly as long as the anthers. Ovary 2-celled. *Fr.*—capsule, reddish, round, opening into 2 broad valves. Seeds solitary, round, covered with a thin white aril. *Fl. t.*—Feb.-Apr. *Fr. t.*—Oct.-Feb.

DISTR. :—Throughout the Western Ghats forests of the Bombay State; common along the banks of rivers in N. Kanara, also in evergreen forests. Widely spread throughout the moist forests of India from the Himalayas southwards, Kumaon to Bhutan : Burma, Ceylon.

DESCR. OF WOOD :—*Colour* grey, when young yellowish-white. *Pores* small, often sub-divided, in groups or in short radial strings, surrounded with white tissue, and arranged in wavy concentric lines. *Med. rays* fine, short, numerous. Moderately hard. *Wt.*—54 lbs. per c.ft.

USES :—Wood used for beams, scantlings and house-posts; an oil is extracted from seeds, used for burning in Nepal.

See—Oils.

HIBISCUS TILIACEUS Linn.

FAM.—Malvaceæ.

COM. NS. :—K. Belli-Pata.

CHAR. :—A much branched small evergreen tree; young parts densely tomentose, 7.5-9 m. high, with a girth of 0.9 m. *L.*—10.4-15.6 × 10.4-13 cm., roundish, cordate-ovate, shortly and abruptly

acuminate, entire, crenulate, rarely lobed, long petioled, leathery, glabrous above, hoary-tomentose and sometimes glandular beneath, 7-nerved. Stipules foliaceous, broadly-oblong, deciduous. *Fl.*—large, yellow, with a dark crimson eye. Peduncles short, woody, terminal, with stipule-like deciduous bracts at the base. Bracteoles (epicalyx) 7-14, linear-lanceolate, connate above the middle, shorter or about the length of the calyx. Calyx 2.6 cm., broadly-campanulate, 5-partite; divisions lanceolate, pubescent externally. Corolla 2-3 times the size of the calyx, campanulate. Staminal tube 4 cm. Ovary 5-celled. Styles 5 connate at the base; stigma capitate. *Fr.*—capsule shorter than the calyx, oblong, acuminate, pentagonal, densely hairy, 5-valved, spuriously 10-celled. Seeds slightly pilose. *Fl. t.*—Jan. *Fr. t.*—Mar.-Apr.

DISTR. :—Konkan and N. Kanara, along the sea-coast; also along the banks of tidal rivers near the sea; coasts of E. and W. Peninsula, Bengal, Sundribans: Ceylon.

DESCR. OF WOOD :—*Colour* grey; heart-wood purplish. *Pores* very numerous, small and moderate-sized, often sub-divided. *Med. rays* fine and moderately broad, not very prominent. *Soft.* *Wt.*—35 lbs. per c.ft.

USES :—Wood commonly used as fuel, occasionally for hut building and catamarans. In Tahiti it is used for planking and building light-boats. Bark fibre which is strong is extensively used in Bengal for ropes and cordage. In Ceylon it is used for mats. It should be useful for paper-making (Gamble). It has the advantage of not easily rotting under water.

See—Fibres.

HOLARRHENA ANTIDYSENTERICA Wall.

FAM.—Apocynaceæ.

COM. NS. :—Conessi Bark Tree, the Kurshi Tree; G. Hath, Kadu-indrajav, Kada; H. Dudhi Karchi, Karva-indyan, Kura; K. Hale, Kudsalu, Kodasige, Veppale; M. Kuda, Pandhra Kuda.

CHAR. :—A small, deciduous, glabrous tree, 7.5-9 m. high; girth .9-1.2 m. *Bark* dark-coloured, furrowed and scaly. *L.*—10-20 × 6.3-9 cm., elliptic, oblong, short-acuminate, obtuse at the base, entire, on a petiole 2-3 lin. *Fl.*—white, 2.5-3.2 cm. diam., inodorous, arranged in terminal corymbose cymes. Corolla-tube puberulous. *Fr.*—follicles smooth, 20-38 cm. long. Seeds pendulous with a tuft of hair at the hilum. *Fl. t.*—Feb.-June. *Fr. t.*—next Mar.; sheds leaves Feb.; new leaves Apr.-May.

DISTR. :—Deciduous monsoon forests, throughout the State from Bombay southwards; ghats and hilly parts of Konkan. Deccan hills, S. M. Country-Belgaum, Kanara-Supa ghat; tropical Himalayas from the Chenab eastwards; throughout India, Travancore: Malacca.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* marked by a faint line. *Pores* small, numerous, grouped in radial lines. *Med. rays* fine, very numerous. Cellular tissue loose. *Soft.* light, works easily. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for plough-yokes, bedstead-legs, pieces of furniture, combs, carved tables, picture-frames, paper-knives, toys, domestic utensils, and for carving fancy articles of various kinds. Wood was tried for pencil manufacture but was found unsuitable. Bark, leaves, flowers and seeds are used medicinally. Leaves are used as fodder.

The tree is of interest and importance in Indian forestry from its great abundance and wide distribution in which respect it is a useful accessory species in clothing the ground and acting as a nurse to more valuable species. It is important for reclothing waste-lands.

*See—*Medicinal Plants, Fodder Plants.

HOLIGARNA ARNOTTIANA Hook. f.

FAM.—Anacardiaceæ.

COM. NS. :—K. Hoolgeri, Kagira, Kootigheri ; M. Sudrabilo.

CHAR. :—A large evergreen tree, 9-15 m. high, girth .9-1.5 m. *Bark* ash-coloured, smooth. Young shoots pubescent. *L.*—15.5-24 × 5.8 cm., about the ends of branches, more or less spatulate or cuneate-ovate or oblong, obtuse or acute, gradually narrowed down to the petiole, entire, coriaceous, shining above, glaucous or not beneath ; nerves 16-20 pairs, strong, conspicuous on both surfaces ; petiole glabrous or rufo-pubescent, with 2 tubercles on the top, furnished about the middle with two subulate, spur-like, deciduous processes. Panicles of compound racemes axillary and terminal, densely rufo-tomentose ; male and female on different trees. *Fl.*—numerous, dull-white, minute ; male flowers smaller than the female. Calyx 5-toothed. Petals 5, villous, cohering at their sides with the margin of the disc. Stamens 5, inserted round the margin of the disc. *Fr.*—drupe, obliquely oblong, rounded at the top, about 2.5 cm. long. *Fl. t.*—Jan.-Feb. *Fr. t.*—June-July.

DISTR. :—Common in the evergreen forests of the Konkan and N. Kanara, southwards in the Western Peninsula, Coorg.

DESCR. OF WOOD :—*Colour* light-grey, with large yellow patches rather lustrous and satiny. *Pores* large, scanty, often subdivided, prominent on a vertical section. *Med. rays* fine, short, not numerous. Soft. *Wt.*—32 lbs per c.ft.

USES :—Wood used for house and boat-building, would do well for light packing cases, cigar-boxes, etc. A very acrid black substance is prepared from the fruit and wood, which is used as a varnish.

*See—*Oils.

HOLIGARNA GRAHAMII Hook. f.

FAM.—Anacardiaceæ.

COM. NS. :—M. Balwuli, Bipte.

CHAR. :—A deciduous tree, about 30 m. high, girth .9-1.2 m. diam., thin, without any rhytidome, covered with scattered, raised, lenticular, corky cells ; inner bark reddish, hard, often fibrous ; young parts pubescent. *L.*—31-62 × 10.5-15.5 cm., broad a little

below the apex, gradually tapering down to the base from a little above the middle, spatulate or oblanceolate-cuneate, acuminate, rigidly coriaceous, shining and sometimes glabrous above, pale and hairy beneath; nerves 20-30 pairs, very prominent beneath, spur-like; deciduous processes 2 or 4. Panicles racemose, terminal; male 31 cm. long, much-branched, rufo-tomentose; female short. *Fl.*—numerous, dull-white, minute; male about 2.5 cm. diam. Calyx cup-shaped, truncated. Styles 3, reflexed. Ovary covered with rust-coloured hairs. *Fr.*—drupe, ovoid, glabrous, 1.7 cm. long. *Fl. t.*—Dec.-Feb. *Fr. t.*—May-June.

DISTR. :—Western Peninsula, Konkan and N. Kanara, common in the evergreen forests.

DESCR. OF WOOD :—Very similar in structure to that of *H. arnottiana*.

USES :—Wood not used for any purpose. Black acrid substance from the wood and fruits used as a varnish.

See—Oils.

HOLOPTELEA INTEGRIFOLIA Planch.

FAM.—Ulmaceæ.

COM. NS. :—*E.* Indian Ehn; *H.* Banchilla, Kalipapri, Kanju, Papar, Papai; *K.* Rasbija, Tapsi, Tayisi; *M.* Papara, Wavali.

CHAR. :—A large spreading, glabrous, deciduous tree, 15-18 m. high, girth 1.5-3.6 m. *Bark* grey, pustular, scaly, with an offensive smell when freshly cut. *L.*—7.5-12.5 × 4-5 cm., ovate, cordate-ovate, elliptic, acuminate, coriaceous, entire, sometimes unequal base. *Fl.*—male and hermaphrodite mixed in short racemes or fascicles at the scars of fallen leaves; perianth hairy, deeply 4-8-parted; segments caducous. Stamens 5-9. Ovary stipitate, compressed, usually 1-celled; styles 2. *Fr.*—sub-orbicular, flat, 2.5 cm. in diam., winged all round, emarginate or 2-cleft at the apex. *Fl. t.*—Feb.-Mar. *Fr. t.*—rainy season. Sheds leaves Oct.-Jan. New leaves Mar.-Apr.

DISTR. :—Throughout the State in deciduous forests of Konkan (Nagotana), Deccan (Poona, Khandala), S. M. Country (Belgaum). Outer lower ranges of the Himalayas, from Bihar to Travancore, and from Pegu to Ceylon.

DESCR. OF WOOD :—*Colour* light yellowish-grey; no heart-wood. *An. rings* indistinct. *Pores* small, uniformly distributed, joined by very fine and often faint lines of soft texture, frequently filled with a white substance, marked on a vertical section. *Med. rays* fine, short, undulating, uniform, equidistant visible on a radial section; the distance between rays equal to the transverse diameter of the pores. Moderately hard, strong, light; seasons well. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for buildings, agricultural implements, shafts, yokes, carts, combs, good for matches and inner-boxes. Has been

tried and found suitable for brush-backs. Used also for carving; used for fuel and charcoal. Leaves are lopped for cattle fodder. An oil is extracted from the seed in Melghat.

See—Fodder Plants, Oils.

HOMALIUM ZEYLANICUM Benth.

FAM.—Samydaceæ.

COM. NS. :—No common names.

CHAR. :—A medium-sized or large tree, 12-18 in. high and .75 m. in diameter. *Bark* smooth, grey, lenticellate, mealy, inner bark white. *L.*—7.5-10 × 5 cm., ovate-elliptic, or ovate, obtusely acuminate, narrowed at both ends, crenate, shining, glabrous. *Fl.*—numerous, small, white, on small slender pedicels, arranged in dense axillary racemes, usually clustered at the ends of branchlets. Calyx tube oblong, 4-5, divided. Styles 3-4. *Fr.*—capsule, coriaceous, dehiscing partially, 3-4-valved. *Fl. t.*—Apr.-May.

DISTR. :—Rain-forests of the Northern Ghats of N. Kanara from Diggi to Ainsli; sparsely distributed. Konkan; S. M. Country; Western Peninsula : Ceylon.

DESCR. OF WOOD :—*Colour* greyish-red to red, darker in the centre in irregular masses. Even-grained. *Pores* moderate-sized, in radial or slightly oblique strings. *Med. rays* extremely fine, numerous and closely packed. Hard, rough, strong. *Wt.*—52 lbs. per c.ft.

USES :—Wood valuable for building purposes (Beddomc).

HOPEA WIGHTIANA Wall.

FAM.—Dipterocarpaceæ.

COM. NS. :—K. Haiga, Kalbow, Kiralbhogi; M. Kavsi, Kalhoni; Tr. Hopea.

CHAR. :—A tall tree; branchlets pale, when young covered with a dense soft pubescence. *Bark* smooth, exfoliating in large rectangular plates; inner bark white or yellowish, .67 cm. thick. *L.*—13-23.4 × 5.2-8.13 cm., ovate-oblong or lanceolate, obtuse or acute at the apex; acute, rounded or emarginate at the base, glabrous; nerves oblique, rather prominent above; petiole, pubescent. *Fl.*—pink, about 2 cm. diam., secund, with a bract at the base of pedicels, arranged in racemose, axillary panicles 1-6, usually 3 together, shorter than or about the length of the leaves. Calyx glabrous, segments lanceolate, obtuse. *Petals* hairy externally. Stamens about 15; anthers terminated with a bristle about 4 times their length. Ovary 3-celled, each cell 2-ovuled. Style subulate. *Fr.*—1.34 cm. long, ovoid, with 2 wings. *Fl. t.*—Mar.-June. *Fr. t.*—hot and rainy season. The inflorescence is often diseased and converted in a globular echinate mass resembling Spanish chestnut.

DISTR. :—Evergreen forests of the Western Peninsula from the Konkan southwards. Common along the banks of the N. Kanara ghat rivers and nalas; Madras State.

DESCR. OF WOOD :—*Colour* brown, close-grained. *Pores* moderate sized, surrounded by a white ring, resinous, often grouped 2 or 3 together. *Med. rays* white, distinct, uniform, fine, moderately numerous, concentric white lines resembling annual rings. Hard, smooth, heavy, durable. *Wt.*—54 lbs. per c.ft.

USES :—Wood used for building (beams, rafters, planks, etc.) and pile. In Kanara used for building temples. Excellent fuel and a valuable timber ; said to be the best of the timbers of Tirunelveli.

HYDNOCARPUS LAURIFOLIA Sleam.

(HYDNOCARPUS WIGHTIANA Blume.)

FAM.—Bixaceæ.

COM. NS. :—K. Bhutabi, Nirdivittulu, Toratti ; M. Kadu-kawat, Kantel, Kashtel.

CHAR. :—A tall tree. *Bark* brownish, rather rough, .67 cm. thick. Young shoots and racemes usually brown-pubescent. *L.*—10.4-23.4 × 4-10.4 cm., elliptic-oblong or oblong-lanceolate, acuminate at the apex, round acute or subcordate at the base, acutely serrate or toothed, usually entire, coriaceous or membranous, petiolate. *Fl.*—white, axillary, solitary or racemed, few-flowered. *Scpals* green, pubescent, unequal, the inner ones longer. *Petals* broad, ovate, with soft white hairs and scales at the base, broad-ovate about half the length of petals, hairy. *Stamens* villous at the base. *Ovary* pubescent. *Fr.*—berry, 10.4 cm. diam., pubescent, obtusely-angled, woody, warted. *Seeds* obtusely angular. *Fl. t.*—end of rainy season till Jan.

DISTR. :—Konkan southwards ; common in N. Kanara evergreen forests. Forests of the Malabar Coast ; common in tropical rain-forests.

DESCR. OF WOOD :—*Colour* whitish. *Pores* numerous, small, often sub-divided. *Med. rays* fine, very numerous and closely packed. Wood is fair. *Wt.*—33 lbs. per c.ft.

USES :—Wood occasionally used for beams and rafters and various purposes ; fruit is used in Ceylon to intoxicate fish. *Seeds* yield a yellow oil (*kawa-tel*) used for lamps and medicinally for cutaneous diseases such as leprosy ; also taken internally. It is now generally accepted that the best *chaulmugra* oil is produced from the seeds of this plant.

See—Fish Poisons, Oils, Medicinal Plants.

HYMENODICTYON EXCELSUM Wall.

FAM.—Rubiaceæ.

COM. NS. :—G. Amarachala, Brahmarasalya, Dondra ; H. Bandaru, Bhamina, Bhoswar, Phaldu ; K. Betaga, Doti, Gandle ; M. Bhorsal, Dondru ; Tr. Kuthan.

CHAR. :—A large deciduous, pubescent tree ; 9-15 m. high ; girth 1.8-2.4 m. *Bark* soft, about 2 cm. thick, grey, exfoliating in

irregularly shaped softish scales. *L.*—10.25 × 7.5-12.5 cm., ovate-elliptic, or elliptic-oblong, or almost orbicular, suddenly acuminate, pubescent on both surfaces, membranous; nerves 7-10 pairs; petiole 2.5-7.5 cm., stipules broad, cordate, recurved. Floral leaves long-petioled, 7.5-12.5 cm. *Fl.*—greenish-white, fragrant, numerous, arranged in large spreading compound panicles. Calyx 4 cm. Corolla infundibuliform. *Fr.*—capsule, on recurved pedicels. *Fl. t.*—June-Aug. *Fr. t.*—Oct.-Jan. Leafless—Nov.-Jan.

DISTR. :—Deciduous monsoon forests, sometimes along river-banks; throughout the Deccan and Konkan ghats, Gujarat (Panch-Mahals), S. M. Country, Kanara, Western Peninsula, dry hills at the base of the Himalayas, Bihar, Madhya Pradesh, Southern and Western India.

DESCR. OF WOOD :—*Colour* white when cut up fresh; if cut up dry, brownish-grey. *An. rings* indistinctly marked. *Pores* moderate-sized, scanty, single or sub-divided. *Med. rays* few, moderately broad, alternating with others, fine, visible as a silver-grain on a radial section, bent round the pores. Wood-cells large; straight-grained and of medium texture. Soft, light, non-ornamental, not strong, moderately durable; air-seasons well; easy to saw and work; turns well; can be brought to a fine finish easily; absorbs more polish. *Wt.*—31 lbs. per c.ft.

USES :—Wood used for agricultural implements, palanquins, toys, scabbards, grain-measures, drums, tea-boxes, cooperage, brush-backs; suitable for box-planking and ply-wood; excellent for match manufacture. Bark is bitter and used medicinally; also employed in tanning; leaves used as fodder.

See—Medicinal Plants, Dyes and Tans, Fodder Plants.

HYMENODICTYON OBOVATUM Wall.

FAM.—Rubiaceæ.

COM. NS. :—*K. Bogi*, Hire-mara; *M. Karwei*, Sirid.

CHAR. :—A large deciduous tree, reaching 15 m. high. *Bark* gray, shining, scaly brown within; inner bark white with yellowish bands of soft tissue. *L.*—10 × 5.6-3 cm. crowded at the apex of the branches, elliptic or broadly-obovate, abruptly-acuminate, glabrous on both sides, or sometimes pubescent beneath, finely reticulate; 6-8 pair of nerves, narrowed into a petiole 4-5 cm.; stipules ovate-oblong, glandular-serrate. *Fl.*—small, greenish, in spiciform terminal racemes, several together, each generally furnished with a coloured floral leaf. Calyx hairy. *Fr.*—capsule, erect. *Fl. t.*—Aug.-Sept. *Fr. t.*—Nov.-Dec. There are two varieties of this species, one with large ovate pubescent leaves and capsule 2.5 cm., and the other with small, ovate nearly glabrous leaves and capsule 1.3 cm.

DISTR. :—Throughout the moist forests of the Konkan and N. Kanara, Western Peninsula from Bombay to Travancore.

DESCR. OF WOOD :—*Colour* brownish-grey. *Pores* scanty, moderate-sized, single or sub-divided radially. *Med. rays* few,

moderately broad, alternating with others, fine, forming a silver-grain on a radial section. Very like that of *H. excelsum*. Wt.—about 36 lbs. per c.ft.

USES :—Same as *H. excelsum*.

ILEX MALABARICA Bedd.

FAM.—Aquifoliaceæ.

COM. NS. :—No common names.

CHAR. :—A large glabrous tree, with a trunk attaining sometimes more than 3 m. girth. *L.*—variable in length and breadth, usually $10\cdot5\text{--}13 \times 2\cdot5\text{--}4$ cm., ovate-elliptic or elliptic-acuminate, entire, coriaceous, shining green above, pale beneath on a small petiole, which is channelled about. *Fl.*—small, white, usually 6-merous. Peduncles and pedicels puberulous. *Male fl.* in small umbellules. *Female fl.* solitary or fascicled; fascicles very shortly peduncled; pedicels 3-4 together, rarely solitary. Calyx lobes broad, sub-acute, shortly ciliate. Petals connate at the base. Stamens often only 4, inserted at the base of the corolla; filaments short. Ovary of the male flower imperfect. Ovary of the female 6-celled. *Fr.*—drupe, size of a pea, globose, red when ripe. *Fl. t.*—Feb.-Apr. *Fr. t.*—rainy season.

DISTR. :—Western Peninsula from the Konkan southwards. On the Belgaum and N. Kanara ghats in evergreen forests; along the banks of streams near Anmode, in Supa sub-division of N. Kanara. Hills of S. India.

DESCR. OF WOOD :—Colour greyish-white; with a pretty silver-grain on radial section. Moderately hard. Wt.—37 lbs. per c.ft.

USES :—Wood used for platters and other utensils; suitable for cabinet work.

IXORA BRACHIATA Roxb.

FAM.—Rubiaceæ.

COM. NS. :—K. Gorbale.

CHAR. :—A small tree, 4·5-9 m. high. *Bark* smooth, grey with thin hard corky layer. *L.*— $7\cdot5\text{--}14 \times 4\cdot5\text{--}5$ cm., pale when dry, elliptic-oblong or lanceolate, obtuse, glabrous, attenuated at the base, stipulate. *Fl.*—white, odorous, in sessile or shortly peduncled cymes brachiate with 2-3 pairs of long branches; flower buds globose. Corolla-tube without hairs in the mouth, lobes broadly oblong, rounded at the apex, deflexed. *Fr.*—globose or didymous, the size of a pea, smooth, purplish-black, edible. Seed hemispheric, rugose, with a deep pit. *Fl. t.*—Nov.-Feb. *Fr. t.*—Apr.-May.

DISTR. :—Western Peninsula from the Konkan southwards in ever-green forests. Common on the N. Kanara ghats, Deccan, Khandala.

DESCR. OF WOOD :—Colour reddish-grey. *An. rings* indistinct. *Pores* small, numerous, equally distributed. *Med. rays* fine and very

fine the latter indistinct. Hard, smooth, compact. Wt.—52 lbs. per. c.ft.

USES :—Use of wood not known. Fruit is edible.

See—Fruit Trees.

IXORA PARVIFLORA Vahl.

FAM.—Rubiaceæ.

COM. NS. :—*E.* Torch tree ; *H.* Kola-gandhal, Makrichijhar ; K. Gorvi, Hennu, Korgi ; *M.* Kurat, Lokundi, Rai-kuda.

CHAR. :—A small evergreen handsome tree, 7·5-9 m. high, girth 6-9 m. Bark thick, dark-brown, covered with raised dots, exfoliating in irregular rounded scales. Inflorescence pubescent. *L.*—7·5-15 × 4·6·5 cm., coriaceous, short-petioled, oblong or elliptic-obtuse, with rounded or cordate base ; nerves slender, about 10 pairs ; venules prominently reticulate. Stipules triangular. *Fl.*—white or pink, 8-1·3 cm., odorous, sessile or pedicelled, arranged in branched cymes. *Fr.*—small, didymous. Seed plano-convex. *Fl. t.*—Jan.-Apr. *Fr. t.*—May-June.

DISTR. :—Throughout the State in deciduous forests, Konkan (Matheran), Mawal (Khandala), S. M. Country (Belgaum) ; Kanara (Kala Nadi). Throughout considerable part of India, chiefly in hilly districts ; Southern India from Satpudas southwards ; Western Bengal, Behar, Madhya Bharat ; Burma.

DESCR. OF WOOD :—*Colour* light-brown to reddish-brown. Close-grained. *Pores* small, evenly distributed. *Med. rays* very fine, very numerous, regular. Very hard, smooth ; works easily ; takes good polish. Wt.—60 lbs. per c.ft.

USES :—Wood used for turning, engraving, furniture, building purposes and fuel. The green branches make good torches used by dak-runners. Leaves are fed to buffaloes.

See—Fodder Plants.

KANDELIA RHEEDII W. & A.

FAM.—Phizopboraccæ.

COM. NS. :—*M.* Kandal.

CHAR. :—An evergreen large shrub or a small tree. Bark spongy, red-brown, peeling off in smooth flakes. *L.*—6·5-13 × 2·5-6 cm., elliptic-oblong, obtuse, dark-green and polished above, reddish-brown beneath. *Fl.*—in axillary cymes, peduncles longer than the petioles, 4-9-flowered. Calyx externally rugose, lobes narrow linear, acute. Petals bifid ; lobes divided into numerous capillary segments. Stamens indefinite, of unequal length. Ovary half-inferior, 1-celled. *Fr.*—1·3-2·5 cm., long obovate, girth above the middle with the reflexed calyx-lobes ; protruded radical 15-38 cm. long, cylindric, acuminate. *Fl. t.*—Mar. (T. Cook), June-July (Talbot). *Fr. t.*—Sept.-Oct.

DISTR. :—Tidal swamps along the coast, Kanara, Sundribans and tidal shores of both Peninsulas. Bengal. Burma.

DESCR. OF WOOD :—*Colour* reddish-brown. Close-grained. *Pores* very small, very numerous. *Med. rays* yellowish, very short moderately broad, prominently marked on a radial section; the distance between the rays being many times broader than the transverse diameter of the pores. Soft. *Wt.*—about 40 lbs. per c.ft.

USES :—Wood used as fuel. Bark is used in Tavoy in dyeing red, probably as a mordant.

See—Dyes and Tans.

KIGELIA PINNATA DC.

FAM.—Bignoniaceæ.

COM. NS. :—*E.* The Fetish or the Sausage tree.

CHAR. :—A handsome large tree, 6-15 m. high. *Bark* greyish-brown, rough. *L.*—alternate, imparipinnate, crowded at the ends of the branches. Leaflets 7-9, elliptic-oblong, 7.5-15 cm. long, serrate or entire; lateral leaflets sessile, terminal one with a very long stalk. *Fl.*—large dark-maroon, in long pendulous panicles; corolla tube about 7.5 cm., dilated at the mouth. *Fr.*—gourd-like 6-9 m. long, 12.4 cm. diam., hanging on a very long peduncle or cord making a very striking object. *Fl. t.*—hot season.

DISTR. :—Largely planted in India and the State in gardens. Native of Tropical Africa.

DESCR. OF WOOD :—*Colour* grey. *Pores* small, in irregular, sometimes interrupted, concentric wavy bands of soft texture. *Med. rays* fine, numerous. Hard, good.

USES :—Fruit when cut and slightly roasted is said to be used in Africa as outward application in certain diseases.

N.B.—The tree grows rapidly if planted on the margin of a tank in rich soil, and is propagated by seed. If grown in open it branches badly and requires heavy pruning if it is to be kept straight.

KLEINHOVIA HOSPITA Linn.

FAM.—Sterculiaceæ.

COM. NS. :—No common names.

CHAR. :—A small handsome tree; trunk straight. *Bark* brown, smooth, moderately thick. *L.*—15.6-31.2 × 5.2-7.8 cm., alternate, broad-cordate or ovate, acuminate, entire, thin, membranous and smooth on both sides, 3-5-nerved; petiole almost as long as the blade. Stipules ensiform. *Fl.*—pink or rose-coloured, slightly fragrant, numerous, arranged in large, terminal, cymose panicles. Bracteoles ensiform. Pedicels downy, jointed. Calyx 5-partite, deciduous; segments lanceolate, villous, nearly equal, longer than corolla. Petals 5, unequal; the upper with longer claws; margins involute; lateral pair oblong, concave, and pressing on the staminal column; lower pair also oblong, but larger. Staminal column

expanded above into a bell-shaped, 5-cleft cup; each division with 3 anthers, with cells diverging and one short staminode between each division. Ovary ovate, villous, inserted on the cup of the column, 5-lobed, 5-celled. Styles slender; stigma 5-partite. *Fr.*—capsule, inflated, membranous, pyriform, turbinate, 5-lobed, loculicidally 5-valved. *Seeds* 2.6-5.2 cm., small, round, tubercled. *Fl. t.*—end of rainy season. *Fr. t.*—Oct.-Nov.

DISTR. :—Southern Konkan. Planted throughout the State (Poona), Madras; Ceylon, Malacca, Singapore, Java, and the Philippines. Believed to have been introduced into India in 1798 from the Moluccas.

DESCR. OF WOOD :—*Colour* white. *Pores* large, scanty, single or in short strings of 2 or 3. *Med. rays* moderately-broad to broad, not numerous. *Soft*.

USES :—Handsome avenue tree with large leaves, pink flowers and persistent membranous capsules. It is stated that the old wood is highly valued in Java for various purposes.

KNEMA ATTENUATA Warb.
(**MYRISTICA ATTENUATA Wall.**)

FAM.—Myristicaceæ.

COM. NS. :—K. Hedaggal, Rakta-mara; M. Ran-Jaiphall, Manpatra. (As the inner bark contains much red juice the tree is named Rukta-mara in Kannada).

CHAR. :—A tall evergreen, handsome tree, branches drooping or horizontal, youngest branches and inflorescence covered with golden, deciduous tomentum. *Bark* scaly, coming off in patches exposing a brown surface beneath; the inner bark with much red juice. *L.*—12.5-20 × 4.5-7 cm., oblong-lanceolate, long, attenuated, acute or rounded at the base, membranaceous, glabrescent when old, glaucous beneath; lateral veins 12-20 on each side; petioles 2.2-5 cm. *Fl.*—sub-globose; peduncles axillary, woody, fascicled, short, few-flowered; pedicels longer than the peduncles or nearly equal; bracteolate about the middle. Perianth sub-globose, scurfy. Anthers 12 round a flat disc. *Fr.*—oval or oblong, tawny-tomentose, 2.5-5 cm. long. Aril very thin-lobed at the apex. *Fl. t.*—Oct.-Feb. *Fr. t.*—rainy season.

DISTR. :—Very common in the evergreen forests of the Konkan and N. Kanara ghats, Khandala. Travancore mountains. 6-900 m.

DESCR. OF WOOD :—*Colour* light reddish-brown. *Pores* small to moderate-sized, sub-divided radially, scanty. *Med. rays* fine, not numerous, concentric lines less clearly marked than in other species. *Soft*, rather light, handsome; easily worked. *Wt.*—32 lbs. per c.ft.

USES :—Wood is used for all purposes where light, handsome and easily-worked wood is required. It is available in large quantities in N. Kanara.

KYDIA CALYCINA Roxb.

FAM.—Malvaceæ.

COM. NS. :—*H.* Choupultea, Patari, Patha, Pola ; *K.* Bellaka, Billu-bhendy ; *M.* Bhendy, Ranbhendy, Warung.

CHAR. :—A small or moderate-sized tree, 7·5-12 m. high, girth 9·1-2 m. *Bark* 67 cm. thick, grey, peels off in irregular flakes. All young parts and inflorescence more or less stellate-tomentose or velvety. *L.*—10·4-13 × 7·8-10·4 cm., cordate, roundish or ovate-obtuse, acute, or acuminate, palmately 5-7-nerved at the base, more or less deeply lobed, middle lobe longest, dark-coloured above, pale and velvety beneath. Petiole 2·6-5·2 cm. *Fl.*—polygamous, white, pink, or sometimes pale-yellow, in axillary and terminal panicles. Bracteoles 4-6, nearly as long as the calyx, ultimately enlarging. Calyx campanulate, 5-lobed and persistent. Petals 5, obcordate, oblique, longer than the calyx. Stamens monadelphous, the tube divided to about the middle into 5 bundles, each bearing 3-8 reniform anthers. Ovary 3-celled. Style 3-cleft ; stigma peltate. *Fr.*—capsule, globose, 3-valved, opening loculicidally. Seeds reniform, furrowed, stellately pubescent. *Fl. t.*—July-Oct. *Fr. t.*—cold season onwards. Sheds its leaves in Feb. ; new foliage Apr.-May.

DISTR. :—Common in the deciduous forests on the N. Kanara and Konkan ghats ; also found on the dry Deccan hills of the Poona district. In deciduous forests throughout India and Burma and not in the arid regions. Common in the Sub-Himalayan tract.

DESCR. OF WOOD :—*Colour* white, heart-wood grey. *An. rings* marked by white lines. *Pores* scanty, moderate-sized, often oval and sub-divided. *Med. rays* short, fine to broad, numerous, joined by white transverse bars, caused by faint concentric lines ; on a radial section distinctly visible as long straight bands, giving a marked silver-grain. *Soft.* *Wt.*—about 40 lbs. to c.ft.

USES :—Wood used for inferior house building, agricultural implements, for carving and matches. Bad fuel as it burns with unpleasant smell. Inner bark used for elephant timber-dragging ropes in N. Kanara. Fibre can be used for cordage and paper-stock. It is also used to clarify sugar in N. India.

See—Fibres.

LAGERSTROEMIA LANCEOLATA Wall.

FAM.—Lythraceæ.

COM. NS. :—*E.* Benteak ; *K.* Arale, Balandur, Billi-nandi ; *M.* Nana ; *Tr.* Benteak.

CHAR. :—A large deciduous tree, 9-15 m. high ; girth 1·2-1·5 m. *Bark* white, smooth, peeling off in thin flakes like paper. *L.*—2·5 cm., ovate, or elliptic-lanceolate, acuminate, narrowed at the base into a petiole, glabrous, white beneath. *Fl.*—white, larger than in the last species, in lax compound panicles. Pedicels slender and downy. Calyx sometimes white-tomentose, not ribbed ; lobes finally patent or reflexed. *Fr.*—capsule, smaller than that of

L. parviflora, usually about 8-1.3 cm., very hard. *Fl. t.*—Mar.-Apr. *Fr. t.*—Nov.-Jan.

DISTR. :—Throughout the State in deciduous forests. Common in N. Kanara ; Western Peninsula southwards to Travancore.

DESCR. OF WOOD :—*Colour*—sap-wood greyish-white ; heart-wood red or reddish-brown. *An. rings* fairly distinct. *Pores* small to large often sub-divided and in patches or singly joined by narrow irregular transverse wavy bands of soft texture. *Med. rays* very fine, very numerous, bent round the small pores and either bent round or ending in the larger pores. Pores conspicuous on a longitudinal section. Straight-grained, rather coarse textured. Moderately hard, strong ; if handled carefully and dried slowly, air-seasons without degrade ; liable to split, not durable in the open ; not prone to fungus attack ; difficult to treat with preservatives ; easy to saw and work, finishes to a fine smooth surface ; takes a good polish. *Wt.*—44 lbs. per c.ft. One of the principal timbers of N. Kanara. A useful utility wood if properly seasoned.

USES :—Wood used for house-building, ship-building, furniture, coffee-cases, oil-casks, ploughs, carts, flooring of waggons, turning ; might be suitable for paving blocks. Suitable for all constructional purposes and especially where elasticity and spring are required.

LAGERSTRÆMIA PARVIFLORA Roxb.

FAM.—Lythraceæ.

COM. NS. :—G. Kakria ; H. Adhuri, Bakli, Katdhaura, Lendya, Seina ; K. Chununge, Ventaku ; M. Bondara, Lendi, Nandi, Sokutia ; Tr. Lendi.

CHAR. :—A large deciduous tree, 15-21 m. high ; girth 1.8-2.4 m. *Bark* light brown, thin, exfoliating in long, thin, woody scales. Glabrous, branchlets and young leaves are pubescent at least on midrib. *L.*—5-9 cm., oblong, opposite, coriaceous, sessile or shortly-petiolate, rounded at the base, acute or acuminate-obtuse, glaucous beneath. *Fl.*—white, fragrant on slender pedicels, forming lax axillary or terminal panicles. *Calyx* glabrous or minutely-downy, not ribbed ; lobes 6-7, ultimately erect, adpressed to the fruit. Petals clawed crumpled. The 6 outer stamens much longer than the inner ones. *Fr.*—capsule, oblong or obovate-oblong, 1.3-2.5 cm. long, 3-4-celled. Seeds with a terminal wing. *Fl. t.*—Apr.-June. *Fr. t.*—rainy season. Sheds leaves Mar.-Apr. ; new leaves—May. The tree often produces burs especially when injured. Large trees are often hollow in the centre.

DISTR. :—Throughout the State in deciduous forests from the coast inland ; Konkan, Deccan hills ; S. M. Country (Belgaum), base of the W. Himalayas, W. Peninsula.

DESCR. OF WOOD :—*Colour* grey or greyish brown, often almost red, darker coloured near the centre. No *an. rings*. *Pores* moderate-sized and large, often subdivided, surrounded singly or in patches by pale rings, which are joined by fine, narrow, irregular, wavy, interrupted and anastomosing bands of loose texture. *Med. rays* fine, very numerous, inconspicuous. Pores are conspicuously

visible on a longitudinal section. Straight-grained but sometimes with twisted fibres, coarse in texture. Very hard, moderately heavy; very difficult to season; fairly durable; fairly easy to saw and work; can be finished easily to a fine finish; takes a good polish after careful filling. Timber has a fault of splitting a good deal at the centre. *Wt.*—53 lbs. per c.ft.

USES :—Wood used for house-building, carts, agricultural implements, furniture, boats, tool-handles, cooper's work, railway sleepers; might be suitable for paving blocks; good fuel; gives good charcoal. Bark and leaves used for tanning. Bark gum sweet and edible. Leaves are fodder for buffaloes. "Tasar" silk-worm will feed on the leaves.

See—Fodder Plants, Dyes and Tans, Gums and Resins.

LAGERSTRÆMIA SPECIOSA Pers.

(*LAGERSTRÆMIA FLOS-REGINÆ* Retz.)

FAM.—Lythraceæ.

COM. NS. :—*H.* Arjuna, Tarul; *K.* Challa, Holemati, Nirabendeka; *M.* Bondara, Taman; *Tr.* Jarul.

CHAR. :—A large deciduous tree, 9-18 m. high; girth 1.8-3.6 m., branches widely spreading. *Bark* pale, smooth, flaking off in irregular pieces. Glabrous, sometimes with a few scattered straight spines, 2.5-7.5 cm., on old trunk and branches. *L.*—10-23 cm. broad, elliptic or oblong-lanceolate, obtuse, entire, coriaceous. *Fl.*—5-6.5 cm. diam., showy, lilac, on thick whitish pedicels, forming large, not dense, panicles. Calyx clothed with white or tawny tomentum, 12-14-ribbed. Petals wavy. Stamens all equal in length. *Fr.*—capsule, oblong, 6-celled. Seeds brown with a lateral wing. *Fl. t.*—Apr.-July. *Fr. t.*—cold season.

DISTR. :—On the N. Kanara and Southern Konkan ghats along the banks of nalas and rivers; sometimes planted as an ornamental tree; East Bengal, Assam, West coast of India. Ceylon, Malaya, China.

DESCR. OF WOOD :—*Colour* light-red, shining. *An. rings* marked by a belt of large pores. *Pores* of all sizes, from extremely small to large, the latter often sub-divided, joined by narrow, wavy and often anastomosing concentric bands of soft tissue, which contain the smaller pores. *Med. rays* very or extremely fine, often indistinct. Hard, straight-grained, of medium texture, durable, strong; seasons easily; easy to work and saw; can be finished to a fine smooth surface and sharp edge; takes a good polish; resists salt-water well; more or less immune to fungus attack; attacked by white ants. *Wt.*—43 lbs. per c.ft.

USES :—A valuable wood for many purposes; used for house-building, bridge construction, piles, dug-out canoes, ship-building, railway-waggons, carts and their parts, well construction, rice-pounders, mortars, furniture, cooper's work, gun-carriages, turning; might be suitable for paving blocks. Leaves are fed to cattle.

See—Fodder Plants.

LANNEA GRANDIS Engl.
(**ODINA WODIER** Roxb.)

FAM.—Anacardiaceæ.

COM. NS. :—*H.* Ginyan, Kimul, Mogenā ; *K.* Gojal, Punil, Shimti ; *M.* Moi, Moja, Shimbāt, Shimti.

CHAR. :—A moderate-sized or large deciduous tree, 12-15 m. high, girth 1.5-2.4 m. *Bark* 1.3 cm. thick, gray, compact, smooth, exfoliating in small irregular plates, inner bark red, mucilaginous. Young parts and inflorescence covered with stellate tomentum. *L.*—31-47 cm., unequally pinnate near the ends of branches. Leaflets 7-9, 5-15 × 1.3 cm., oblong-ovate, caudate-acuminate, entire, membranous, glabrous, sub-sessile, the terminal one long petiolulate. Racemes slender ; male compound, long ; female simple and short. *Fl.*—tetramerous, purplish or greenish-yellow, on short pedicels. Bracts ciliate. Sepals obtuse, ciliate. Petals twice as long, oblong, coriaceous, spreading. Stamens 8, in male flowers as long as the petals. Ovary, sessile, 1-celled. *Fr.*—drupe, kidney-shaped, red or purple when ripe, size of a pea. *Fl. t.*—Feb.-Mar. *Fr. t.*—hot season. Remains leafless from Feb.-June. On the east side of the Peninsula in leaf almost throughout the whole year ; ugly when leafless but handsome in full foliage.

DISTR. :—Common throughout the State in deciduous forests. Throughout the hotter parts of India. Lower Himalayas and the sub-Himalayan forests, Assam, Bengal, Madras, Madhya Bharat, South India : Burma, Ceylon and Andamans. Very commonly planted.

DESCR. OF WOOD :—*Colour* heart-wood light-red when fresh cut, turning reddish-brown on exposure ; sap-wood large, white. Close-grained. *Pores* moderate-sized, uniformly distributed, scanty, often sub-divided. *Med. rays* fine, short, bent, where they touch the pores. Moderately hard ; works and polishes well. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for house-building (chiefly planking), packing-cases, common furniture, carts, oil-presses, rice-pounders, plough-shafts, water troughs and pipes, well-construction, dug-out canoes, ribs and helms of boats, spear-shafts, combs, bowls, jars and other utensils, carving, turning, cooper's work and mining timber. Makes inferior wood-pulp with good bleaching powder. Very good for matches and inside match-boxes. Bark good for tanning. Trunk yields yellowish white gum used for cloth-printing and in medicine. Leaves, young shoots fodder for cattle.

See—Dyes and Tans, Gums and Resins, Fodder Plants.

LASIOSIPHON ERIOCEPHALUS Dcne.

FAM.—Thymelacaceæ.

COM. NS. :—*E.* Woolly-headed gnidia ; *K.* Kukurgal, Mukute, Rami ; *M.* Rametta.

CHAR. :—A much branched large shrub or a small tree attaining height upto 7·5 m. in good situations. *Bark* mottled, smooth, inner bark fibrous. *L.*—opposite or scattered, sub-sessile, 5·7·5 × 2·2·5 cm., oblong-lanceolate, glabrous above, silky beneath. *Fl.*—in erect dense terminal heads, 2·5-3·8 cm. diameter, surrounded at the base by an involucre of silky villous bracts, yellow, perianth tube densely silky villous, lobes 4, oblong, flat, with a linear 2-fid scale at each division. *Fr.*—ellipsoid-oblong, pointed, enclosed in the perianth. *Fl. t.*—Dec.-May (Cooke), Oct.-Feb. (Talbot). *Fr. t.*—Mar.-Apr. (Talbot).

DISTR. :—Western Peninsula on the ghats from the Konkan southwards. Common on the Supa ghats in deciduous forests. Very common at Mahabaleshwar, Matheran, Bengal : Ceylon.

DESCR. OF WOOD :—*Colour* white or yellowish white. *Pores* small, single or in groups of 2 to 4, which are scantily distributed in short, more or less concentric patches. *Med. rays* fine, irregularly spaced. *Hard.* *Wt.*—38 lbs. per c.ft.

USES :—Leaves and bark used medicinally; bark is used to intoxicate fish. The bark also yields a useful fibre, which would be useful for paper making.

See—Medicinal Plants, Fibres, Fish Poisons.

LEPISANTHES TETRAPHYLLIA Radlk.

(HEMIGYROSA CANESCENS Thw.)

FAM.—Sapindaceæ.

COM. NS. :—K. Kalu-yette, Kurpah, Mooltaga; M. Kurpa, Lokhandi.

CHAR. :—An evergreen, middle-sized tree with a trunk of considerable thickness but not straight. A fairly large and straight tree in N. Kanara (Talbot). *Bark* ash-coloured, slightly scabrous. Young parts shortly greyish tomentose. *L.*—13-52 cm. long. Leaflets 2-8, 6·5-26 × 2-13 cm., mostly opposite, elliptic-oblong, ovate, obovate or lanceolate, generally obtuse or emarginate or acute at the apex, entire, coriaceous, glabrous, shining, on short, thick, puberulous petiolules. *Fl.*—white, small, in racemes, simple or paniced, axillary or from the leafless branches. Sepals 4, silvery-canescant. Petals 4, furnished with bifid scales at the base. Stamens 6-8, in male flowers 6-10. Ovary 3-celled. *Fr.*—fleshy, sub-globose or 3-gonous, tomentose, 1·3-2·5 cm. diam., often 1-seeded by abortion. *Fl. t.*—Feb.-May. *Fr. t.*—June-July.

DISTR. :—Common in the Konkan, Ram ghat, Kusur ghat, Khandala, Bhimashankar; Deccan and the eastern side of the Peninsula; throughout N. Kanara : Ceylon, Burma.

DESCR. OF WOOD :—*Colour* white. Close-grained, with very numerous, very prominent, wavy white concentric bands and concentrically arranged patches, about 70 to the inch. (2·5 cm.). No distinct heart-wood. *Pores* moderate-sized, scanty, often sub-divided. *Med.*

rays extremely fine, regular and regularly distributed. Hard, smooth, shining. Readily attacked by boring insects. Wt.—45 lbs. per c.ft. (Talbot). 54 lbs. per c.ft. one specimen (Troup).

USES :—Wood used for buildings.

LIGUSTRUM NEILIGHERRENSE Wight, Var. OBOVATA.

FAM.—Oleaceæ.

COM. NS. :—*M. Kungin*.

CHAR. :—A large shrub or a small tree. Bark thin, greyish-white ; bark of the branches copiously studded with white lenticels. L.—10.5 × 2.5-4 cm., ovate-elliptic, acute or acuminate, coriaceous, entire, short-petioled. Fl.—numerous, white, fragrant, on thyrses at the end of branches. Fr.—black, size of a pea, covered with powdery bloom when ripe. Fl. t.—Aug.-Nov. Fr. t.—ripe Jan.

DISTR. :—On the higher ghats of the Konkan and N. Kanara, common in moist forests. Western Peninsula from Bombay southwards.

DESCR. OF WOOD :—Colour white with satiny lustre. Close-grained. Pores small, often in radial lines or triangular groups of three. Med. rays fine, numerous. Moderately hard, durable.

USES :—Wood used for the construction of huts and as fuel at Mahabaleshwar (Lisboa).

LIMONIA ACIDISSIMA Linn.

FAM.—Rutaceæ.

COM. NS. :—*H. Belli* ; *K. Kuduvetadu*, *Kadbella*, *Nimbaimara* ; *M. Kowat*, *Tondasha*.

CHAR. :—A small thorny tree ; thorns straight, solitary, axillary, 1.34-2.6 cm. long ; branches rigid, woody. Height 6-7.5 m., girth 3-6 m. Bark thin, light brown, corky, slightly cleft vertically. L.—alternate, imparipinnate, 2.6-10.4 cm. long ; common petiole jointed, winged. Leaflets usually 5-9, 2.6-5.2 cm., sessile, opposite, oblong or ovate-lanceolate, obtuse notched or retuse at the apex, cuneate at the base, the terminal one larger, crenate ; punctate with pellucid dots ; joints of rachis crenulate. Fl.—white, fragrant, tetramerous on slender pedicles, in axillary pubescent racemes. Sepals small, ovate or triangular. Petals oblong-elliptic, twice the length of the calyx, pellucid punctate. Stamens 10, free, nearly equal. Filaments subulate, inserted on an annular or columnar disc. Anthers cordate-oblong. Ovary oblong, 4-celled. Style short, thick ; stigma capitate. Fr.—berry, globose, black, 1-4-seeded, very acid. Seeds imbedded in mucilage. Fl. t.—Apr.-May. Fr. t.—Aug.-Sept.

DISTR. :—Common in the Belgaum dist. Dry hills in various parts of India. N. W. Himalayas, Assam, Behar, Madras, Mysore, W. Peninsula.

DESCR. OF WOOD :—Colour yellowish-white, often darker, sometimes even dark olive grey, in the centre. Close-grained.

Pores small, surrounded by pale tissue, solitary or arranged in oblique strings. *Med. rays* very fine, numerous, uniform and equidistant. Numerous concentric rings marked by white lines. Hard; takes a good polish. *Wt.*—about 61 lbs. per c.ft.

USES :—Wood used for axles of oil-presses and rice pounders and is a good fuel. A suitable substitute for boxwood for engraving work. Fruits used medicinally.

LINOCIERA MALABARICA Wall.

FAM.—Oleaceæ.

COM. NS. :—K. Akerkal, Kunta-akerkal, Lavanty, Maniki-mara, Yellum.

CHAR. :—A small tree. *Bark* smooth, shining, grey, covered with raised corky dots; inner bark 1.3 cm. thick, white with yellow fibres, quickly turning dark coloured on exposure. *L.*—7.5-15 × 2.5-5.6 cm., elliptic or obovate-obtuse, acute or acuminate, cuneately alternated at the base, glabrous on both sides, short-petioled. *Fl.*—white, fragrant, 1-3, sessile on the top of a peduncle 1.3 cm.; or several on cymose panicles about 5 cm. Bracts of the ramifications small, deciduous. Calyx usually densely hairy, sometimes glabrous. Petals linear, united in pairs by the stamens. *Fr.*—ovate or obovate, oblong, angled, about 1.3 cm. long. *Fl. t.*—Nov.-Jan. *Fr. t.*—Feb.-June. Flowers have a strong odour like ripe apples in the early morning.

DISTR. :—Throughout the evergreen forests of the Konkan and N. Kanara and southwards, Deccan, Khandala, Lonawala, E. Ghats in the Pallampet taluka of Cudappa.

DESCR. OF WOOD :—*Colour* creamy or yellowish white. Close-grained with a satiny lustre. *Pores* small, single or in short radial lines. *Med. rays* very fine, white, very numerous. Narrow, fine, white, concentric lines, like annual rings, fairly numerous. Very hard, fine, very like boxwood. *Wt.*—65 lbs. per c.ft. (one specimen).

USES :—A possible substitute for boxwood for engraving.

LITSEA CHINENSIS Lam.

FAM.—Lauraceæ.

COM. NS. :—E. Common Tallow Laurel; H. Garbijaur, Maidalakdi; M. Maidalakadi.

CHAR. :—A small evergreen tree (variable), 12-15 m. high, girth 1.2-1.5 m. *Bark* brown, 2.5 cm. thick, somewhat corky, lenticellate; branchlets densely tomentose. *L.*—12.5-25 × 6.3-8.8 cm., alternate, oblong-lanceolate or elliptic-lanceolate or obovate, shortly acuminate or obtusely acute; acute or cuneate at the base, pale beneath, coriaceous. *Fl.*—minute, yellowish, 8-12 in a head forming pedunculate umbels or corymbs of about the length of the petiole or a little longer; involucre of 4 concave bracts; perianth truncate. Stamens about 14, alternating with as many or more staminodes. *Fr.*—berry,

globular, size of a pea, smooth, black and almost dry when ripe, resting on the club-shaped perianth. *Fl. t.*—May-July. *Fr. t.*—Oct. The bruised leaves have the smell of cinnamon.

DISTR. :—Rain-forests, throughout the Konkan and N. Kanara. Throughout the hotter parts of India : Ceylon, Malay Islands, Australia.

DESCR. OF WOOD :—*Colour* greyish-brown or olive-grey, shining. Close and even-grained. *An. rings* indistinctly marked by a white line. *Pores* small and moderate-sized, usually sub-divided radially, uniformly distributed. *Med. rays* fine, and moderately broad. Moderately hard, durable ; seasons well ; not attacked by insects. *Wt.*—47 lbs. per c.ft.

USES :—Wood used for furniture and oars. Root, bark, leaves, fruits and seeds used medicinally.

See—Medicinal Plants.

LITSEA WIGHTIANA Wall.

FAM.—Lauraceæ.

COM. NS. :—K. Hammadi.

CHAR. :—A large handsome evergreen tree. *Bark* light-brown, smooth, with somewhat horizontal lenticels. Branches and under surface of the leaves clothed with rusty brown pubescence. *L.*—7.5-20 × 2.5-7.5 cm., elliptic or oval or obovate-oblong, obtuse or acute, rounded or attenuated at the base, green and glabrous above, usually tomentose or sub-glabrous below ; veins prominent. *Fl.*—in axillary, solitary racemes shorter than the leaves, clothed with rusty pubescence ; involucre 4-6-flowered. *Fr.*—berry, nearly 1.3 cm. long, nearly half-immersed in the cupshaped truncated tube of the calyx. *Fl. t.*—Aug.-Nov. *Fr. t.*—Apr.-May.

DISTR. :—On the southern ghats of N. Kanara in evergreen forests, common near Cairasappa falls ; Sholas of Nilgiris.

DESCR. OF WOOD :—*Colour* yellowish-brown, shining. *Pores* small, often sub-divided or in groups of 2 or 3. *Med. rays* fine, white, numerous. *An. rings* marked by a faint line. Hard. *Wt.*—46 lbs. per c.ft.

USES :—Wood used for rafters, and other economic purposes.

LITSEA ZEYLANICA Nees.

FAM.—Lauraceæ.

COM. NS. :—K. Bili-nisangi ; M. Chirchira, Kanvel.

CHAR. :—A large evergreen tree, 6-9 m. high ; girth .9-1.2 m. *Bark* thick, smooth, grey. Leaf-buds and pedicels pubescent with minute hoary tomentum. *L.*—7.5-15 × 2.5-5 cm., elliptic-oblong, lanceolate, acuminate, narrow at the base, thinly coriaceous, glaucous beneath ; petiole 1.2-2.5 cm. *Fl.*—yellowish-white, short-pedicellate, in dense, axillary, 6-12-flowered clusters ; perianth segments ovate-oblong. Glands of the two inner anthers stipitate. *Fr.*—berry, .9 cm., globular. *Fl. t.*—Oct.-Jan. *Fr. t.*—Jan.-Feb.

DISTR. :—Throughout the Konkan and N. Kanara moist forests common ; Western ghats from Konkan southwards, ascending to 2100 m. in the Nilgiris, Bhootan, Khasia Hills ; Chittagong : Pegu, Tenasserim.

DESCR. OF WOOD :—*Colour* light-brown to yellow. Even-grained. *Pores* small, often sub-divided, evenly distributed. *Med. rays* fine, numerous. Moderately hard, tough.

USES :—Wood used for house-building and planks. Oil from fruits is used for burning.

See—Oils.

LOPHOPETALUM WIGHTIANUM Am.

FAM.—Celastraceæ.

COM. NS. :—K. Balpale, Banate.

CHAR. :—A large, handsome, evergreen tree. *Bark* rough, scaly. *L.*—13-23 × 3-10 cm., elliptic-oblong, obtuse or slightly acute at the apex, obtuse or sub-cordate at the base, coriaceous, quite entire, glabrous on both sides on a petiole about 1·3 cm. *Fl.*—pentamerous, of a full-red colour, 7-9 lin. diam., in axillary and terminal cymes. Calyx lobes very short and broad. Petals with a membranous corrugated crest. Stamens 5. Ovary 3-celled. *Fr.*—sharply triangular, 3-celled, 8-10 cm. long. Seeds numerous imbricate, oblong, compressed, with a long wing. *Fl. t.*—Jan.-Apr. *Fr. t.*—ripe at the beginning of rainy season.

DISTR. :—Western Peninsula from the Konkan southwards in the evergreen forests of the Konkan and N. Kanara ghats ; common on the southern ghats where it attains a very large size.

DESCR. OF WOOD :—*Colour* reddish-grey. Close-grained. *Pores* large, sinuous, usually sub-divided, sometimes in short strings. *Med. rays* fine, conspicuously bent round the pores when they meet them. Parallel narrow concentric lines prominent. The sinuous pores are visible in wavy lines and give the grain a curled appearance on a longitudinal section. Moderately hard. *Wt.*—28 lbs. per c.ft.

USES :—Wood used in S. Kanara for house-building ; also for cooper's work.

LUMNITZERA RACEMOSA Willd.

FAM.—Combretaceæ.

COM. NS. :—No common names.

CHAR. :—A tall glabrous evergreen shrub or small tree, 4·5-12 m. high ; girth 6-1·2 m. *Bark* brown, hard, rough. *L.*—2·5-7·5 cm., sessile coriaceous, veinless, entire or crenate, attenuated at the base, cuneate, obovate, retuse. *Fl.*—small, white, in solitary, simple, axillary spikes, about as long as the leaves or shorter. Bracteoles minute. Calyx tube elongate, bracteolate. Petals 5, spreading. Stamens 10, alternately shorter, occasionally 5. *Fr.*—1·3 cm., ovoid. *Fl. t.*—hot season. *Fr. t.*—Oct.-Nov.

DISTR. :—South Konkan, along salt water creeks and backwaters. Coasts of India : Ceylon, Burma, tropical Africa.

DESCR. OF WOOD :—*Colour* greyish-brown with a small darker heart-wood. *Pores* small, uniformly distributed, often sub-divided or in short radial lines. *Med. rays* fine, numerous, the distance between them about equal to the diameter of the pores. Hard, strong, durable. *Wt.*—54 lbs. per c.ft.

USES :—Wood used for house-posts and other building purposes and fuel.

LUNUR ANKENDA Merr.

(EVODIA ROXBURGHIANA, Benth.)

FAM.—Rutaceæ.

COM. NS. :—K. Kabale.

CHAR. :—A small evergreen unarmed tree, about 7·5-9 m. high, girth 6·9 m. *Bark* yellowish-grey, rough, 67 cm. thick, with deep indentations. Branches opposite; young parts round and somewhat villous. *L.*—opposite, trifoliate; petiole 5·2-13 cm.; leaflets shortly petioluled, 5·2-13 × 2·6-5·2 cm, oblong-elliptic or oblong lanceolate, acute or acuminate, entire, shining above and glabrous on both sides. *Fl.*—numerous, small, densely crowded, yellowish-green, inodorous, tetramerous, on very short pedicels, in axillary, puberulous, dichotomously branched cymose panicles. Bracts minute. Calyx minute, puberulous, 4-toothed. Petals oblong, spreading, about 4 times as long as the segments of the calyx. Stamens inserted at the base of the disc; filaments glabrous, subulate; anthers oblong. Ovary roundish, hairy, deeply 4-lobed, 4-celled. Style short, thick; stigma large, 4-lobed. *Fr.*—capsules 1-4, usually 2 when ripe, obovate, smooth, coriaceous, size of a field bean. Seed smooth, shining, blue-black. *Fl. t.*—Apr.-May. *Fr. t.*—rainy season.

DISTR. :—Khandala, Par-ghat, Mahabaleshwar, throughout the Konkan and N. Kanara ghats, in moist situations from the sea level up to 1,200 m. elevation, in both rain and deciduous monsoon forests; E. & W. Peninsula; Khasia hills; Ceylon, Java, Sumatra, Penang and Malaya.

DESCR. OF WOOD :—*Colour* white or greyish brown. Close and even-grained. *Pores* small surrounded by whitish tissue and arranged in zigzag irregularly concentric lines. *Med. rays* fine, irregular. Moderately hard, strong. *Wt.*—51 lbs. per c.ft.

USES :—Can be used for hut-posts.

MABA NIGRESCENS Dalz.

FAM.—Ebenaceæ.

COM. NS. :—K. Hole-Kuncha; M. Kari, Raktarohida.

CHAR. :—A large shrub (in the plains) or a small tree (in sheltered situations), 4·5-10·5 m. high; young shoots clothed

with tawny pubescence. *Bark* grey, rough with rounded tubercles, breaking off in thick rounded pieces and showing a nearly black under-surface. *L.*—3.7.5 × 1.3.2.5 cm., oval, ovate, obovate or orbicular to linear-lanceolate, coriaceous or membranaceous, glabrous and shining above, or sometimes clothed with tawny adpressed hairs; becomes black in drying. *Fl.*—small, yellow, shortly pedicelled, 3-merous; male usually 3, smaller than female; stamens 6; ovary rudimentary; female solitary, axillary, almost sessile. Calyx minutely pubescent outside. Ovary 3-celled. Style very short; stigma 3-toothed. *Fr.*—3.5-lin. diam., round, smooth, yellow when ripe, 1-3-seeded. *Fl. t.*—Nov.-Feb. *Fr. t.*—Apr.-May.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, up to Mysore. Common on the N. Kanara ghats near Nilkund and the falls of Gairsappa. Alt. 1,800 m.

DESCR. OF WOOD :—*Colour* greyish-brown, very fine numerous wavy regular concentric lines of soft tissue; heart-wood somewhat darker than sap-wood. *Med. rays* very fine, numerous, regular. Wood hard, durable.

USES :—Wood used for various purposes where durability is principally required. The berries are said to be palatable and are eaten by the poor people.

See—Fruit Trees.

MACARANGA PELTATA Muell.
(**MACARANGA TOMENTOSA Wt.**)

FAM.—Euphorbiaceæ.

COM. NS. :—K. Chandkal, Upalkai, Upligi, Upranti; M. Chanda, Chandada, Chandori.

CHAR. :—A small or middle-sized tree, branchlets stout, young shoots tomentose. *Bark* dark-grey. *L.*—12.5.20 × 8.14 cm., ovate or deltoid-ovate or orbicular, cuspidate, broadly peltate, entire or minutely toothed, glabrous above, pubescent and closely gland-dotted beneath, base rounded. *Male fl.*—minute, numerous, in interrupted dense sessile heads, enveloped in bracts, arranged in numerous much-branched axillary, rusty tomentose panicles, sepals 3. *Female fl.*—panicles simpler than in the male; calyx-limb obsolete. *Fr.*—capsule, .6-.9 cm. in diameter, globose, hairy and glandular. Seed globose, brown, rough. *Fl. t.*—Jan.-Mar. *Fr. t.*—Apr.-May.

DISTR. :—Throughout the moist forests of the Konkan and N. Kanara, very common. Matheran, Khandala, Parghat, Thalghat, Western Peninsula. Hills of Orissa and Circars. Ceylon.

DESCR. OF WOOD :—*Colour* reddish-brown. Close-grained. *Pores* large, often oval and sub-divided into 2 or 3, scanty, prominent on a radial section. *Med. rays* very fine, very numerous, giving a fair silver-grain. Soft, smooth. *Wt.*—42 lbs. per c.ft.

USES :—Wood is of little or no value. A light crimson-coloured gum exuding from cuts in the stems is used medicinally and for taking impressions of coins.

See—Gums and Resins.

MACHILUS MACRANTHA Nees.

FAM.—Lauraceæ.

COM. NS. :—K. Gulmavu, Kroma, Kurma ; M. Gulum.

CHAR. :—A large evergreen tree. *Bark* grey, smooth ; branches spreading. *L.*—7.5-20 cm. × 5.7-5 cm., ovate or elliptic oblong, acute or obtuse, glabrous above, glaucous beneath ; petiole channelled. *Fl.*—yellowish, small, on a large, terminal, white, pubescent panicle about as long or longer than the leaves. *Fr.*—berry, globose, small, black. *Fl. t.*—Mar.-Apr. *Fr. t.*—rainy season.

DISTR. :—Western Ghats from the Konkan southwards ; throughout the ghats of N. Kanara and the Konkan, in moist forests : Ceylon. Alt. 450-2100 m.

DESCR. OF WOOD :—*Colour* orange-brown. Even-grained. *Pores* moderate-sized, often sub-divided. *Med. rays* fine, rather irregular, scanty. The distance between them equal to the diameter of the pores. Moderately hard, light. *Wt.*—34 lbs. per c.ft.

USES :—Wood is used for buildings and boats.

MADHUKA INDICA Gmel.

(BASSIA LATIFOLIA Roxb.)

FAM.—Sapotaceæ.

COM. NS. :—E. Honey Tree, Mahuva of S. India ; G. Mahuda, Movonujhad ; H. Moha, Mohua ; K. Ippe, Huli, Movaro ; M. Moha-chejhad, Mohwa.

CHAR. :—A large evergreen tree, 12-15 m. high ; girth 1.2-1.8 m. *Bark* dark yellowish-grey, thick, slightly furrowed, scaly ; inner bark red, milky. Young shoots villous. *L.*—10-18 × 2.5-4 cm., clustered near the ends of the branches, lanceolate, narrow at both ends, entire, smooth on villous petioles 2.5-4 cm., stipules villous, caducous, ensiform. *Fl.*—crowded near the ends of branches, pedicels 5-7.5 cm., sub-erect, one-flowered. Calyx segments 4, acute. Corolla tube equal to length of calyx, limb 8-10-cleft. Anthers 16-20 in two series. *Fr.*—berry, oblong, size of a plum, yellowish when ripe. *Fl. t.*—Apr.-May. *Fr. t.*—Aug.-Sept.

DISTR. :—Common in the dry forests and along the rivers and nalas in the State ; common in the Konkan and N. Kanara but nowhere abundant. Western Peninsula, Mysore, Karnatak. Ceylon, upper Burma. Often planted.

DESCR. OF WOOD :—*Colour* red. Close and straight-grained. *Pores* small to moderate-sized, in short radial or oblique echeloned strings. *Med. rays* numerous, fine, uniform, equidistant, bent round the pores. Transverse bars fine, irregular, wavy. Moderately hard, very flexible, durable. *Wt.*—60 lbs. per c.ft.

USES :—Wood used for house-building, bridge-construction, trenails, carts, furniture ; valued for ship's keels and for planking below the water-line. Flowers are eaten raw, cooked or roasted. Seeds contain about 30 p. c. of yellow oil ; used for lamps, for manufacturing

soaps and for candles. It is also used as an adulterant or substitute for ghee. Bark, flowers and oil are used medicinally.

See—Medicinal Plants, Oils, Famine Plants.

MADHUKA LONGIFOLIA Mecbr.

(BASSIA LONGIFOLIA, Linn.)

FAM.—Sapotaceæ.

COM. NS.:—*E. Butter Tree*, Mahua Tree; *G. Mahuda*, Mahura; *H. Mahua*, Mahula, Mowa; *K. Doddipa*, Honnage Ippi, Pokka; *M. Moha*, Mhowra, Mowda.

CHAR.:—A large deciduous tree, 12-15 m. high, girth 1·8-2·1 m. Bark 1·3 cm. thick, grey with vertical cracks, exfoliating in thin scales; inner bark red, milky. Young parts, petiole and pedicels pubescent or tawny-tomentose. L.—10-20 × 5-10 cm., elliptic or oblong-elliptic, short-acuminate, coriaceous, congested near the ends of branches; petiole round, 2·5-4 cm., stipules subulate, downy. Fl.—white, or yellowish-white, numerous, fleshy, crowded from the extremity of the branches, drooping on pedicels 2·5-4 cm. Calyx 4-5-sepalled, coriaceous, densely rusty-tomentose. Corolla-tube ovoid, limb of 7-14 parts, stamens 20-80 in three series. Fr.—fleshy, ovoid, 2·5-5 cm., 1-4-seeded, very rarely more. Fl. t.—Mar.-Apr. Fr. t.—June-July. Leafless Feb.-Apr.; new leaves appear soon after.

DISTR.:—Deciduous forests; prefer dry sandy and rocky soils; thrives on Deccan trap. Common in the deciduous forests throughout the State; also in Konkan and N. Kanara; often cultivated and self-sown near villages; forests of Madhya Bharat, Madhya Pradesh, Western Bengal, Kumaon Tarai: Burma.

DESCR. OF WOOD:—*Colour* reddish-brown; sap-wood large. *An. rings* indistinct. *Pores* moderate-sized, often sub-divided, not numerous, in short, radial, wavy, lines more or less echelon. *Med. rays* numerous, fine. Numerous parallel, fine transverse bars. Hard to very hard; durable; takes good polish. Wt.—62 lbs. per c.ft.

USES:—The wood is not much used; the tree is so useful for its flowers and fruits that it is rarely cut for timber. It gives good house-posts out of saplings. The seasoned wood is used for house-building, furniture, country vessels, naves of wheels, well-construction, oil-mills, drums, domestic utensils, carving and turning. This is one of the most important forest trees of India, its importance being due mainly to the corollas of its flowers, which are eaten raw or cooked by Bhils and other wild tribes in Khandesh, Nasik and Madhya Bharat. Being sweetish they are eaten in large quantities and form a nourishing food to poorer classes. During the famine of 1873-74 in Behar they kept thousands of people from starvation. A single tree is said to yield 2,000-2,400 lbs. of flowers. Flowers are used in the distillation of country liquor. Fruit yields several valuable products. The outpart of the pericarp is eaten raw or cooked as vegetable. The inner part when dried is ground into flour for making cakes. The seeds (Mathi) contain edible greenish oil which solidifies on exposure into the so called 'MOWHRA' butter, used in cooking and sometimes to adulterate ghee. The dried seeds (Talambi) are collected and exported to Europe for the manufacture

of "vegetable ghee" (hydrogenated oil) and soap. Oil-cake is used to poison fish and the smoke produced from burning it is used to kill insects and rats. Bark, leaves, flowers and fruits are used medicinally. Refuse from the distilleries is used as manure. Leaves, flowers and fruits are eaten by cattle. Tree is often planted in avenues.

See—Medicinal Plants, Oils, Liquors, Fodder Plants, Famine Plants.

MADHUKA MALABARICA Bedd., R. N. Parker.

(**BASSIA MALABARICA** Bedd.)

FAM.—Sapotaceæ.

COM. NS. :—K. Udlu.

CHAR. :—A middle-sized tree. *Bark* dark coloured, scaly. *L.*—7.5-20 × 2.5-5.6 cm., very coriaceous, oblong to lanceolate, glabrous, dark-green, shining, base tapering. *Fl.*—crowded towards the ends of branches in dense fascicles. Calyx segments 4, divided nearly to the base, the 2 outer glabrous, 2 inner hairy. Corolla 1.3 cm. long; tube densely rufous hairy; lobes 6, oblong, hairy outside. Stamens 16-18 in 2 rows. *Fr.*—berry, oblong-lanceolate, glabrous when young. *Fl. t.*—Nov.-Jan. *Fr. t.*—ripe May-June.

DISTR. :—Common in the southern parts of N. Kanara along the banks of rivers and in moist forests near sea-level to 600 m. elevation. N. Kanara; Malabar and Anamalais up to 1,200 m. alt.

DESCR. OF WOOD :—*Colour* light red. *Pores* moderate-sized, in short radial or slightly oblique strings of 6 to 8. *Med. rays* fine, numerous. Transverse bars very fine, very numerous, wavy. Moderately hard, smooth. *Wt.*—42 lbs. per c.ft.

USES :—As other species of Madhuka.

MALLOTUS ALBUS Muell.

FAM.—Euphorbiaceæ.

COM. NS. :—No common names.

CHAR. :—A small evergreen tree, 9-18 m. high, girth .9-1.2 m. *Bark* thin, pale-white, smooth, with a green layer inside, without rhytidome. Young parts and inflorescence tawny or white, with dense stellate tomentum. *L.*—10-20 cm. long and nearly as broad, cordate, sub-peltate, acuminate, entire or obsoletely sinuate-toothed, sometimes lobed, furnished with 2, or sometimes 3-4, glands at the base on the upper side; alternate, glabrous above by age, rusty or white tomentose below; petiole 2.5-10 cm. *Fl.*—very shortly pedicelled; the males in small, almost sessile heads; females solitary and larger, arranged in terminal, more or less elongated panicle. Male calyx 3-4 or rarely 5-parted; stamens about 80; female calyx 4-5-cleft. Ovary densely puberulous, warty. *Fr.*—capsule, globular, tubercled, usually 4-coccous. *Fl. t.*—Sept.-Oct. *Fr. t.*—Nov.-Feb. This is var. *occidentalis* Hook. f.

DISTR. :—S. M. Country, Sikkim, Eastern Bengal, Assam. Western Peninsula on the ghats southwards to Mysore and Ceylon.

DESCR. OF WOOD :—*Colour* white. *Pores* moderate-sized and large, often sub-divided. *Med. rays* very fine, very numerous, equidistant. *Soft. Wt.*—30 lbs. per c.ft.

USES :—Not known.

MALLOTUS PHILIPPINENSIS Muell.

FAM.—Euphorbiaceæ.

COM. NS. :—*E.* Monkey-face Tree ; *G.* Kapilo ; *H.* Kamala, Kambhal, Raini ; *K.* Mullichillu, Kapila, Kesarimavu ; *M.* Shendri, Kapila.

CHAR. :—A small evergreen tree, 7·5-9 m. high ; girth ·9-1·2 m. *Bark* ·6 cm. thick, grey, inner substance red, marked by irregular cracks. Branchlets, inflorescence and under surface of leaves hoary. *L.*—7·5-15 × 3·1-7·5 cm., alternate, ovate or ovate-lanceolate, acuminate or obtuse, glabrous, with minute red glands beneath and 2 depressed glands at the base above, entire, or sometimes slightly toothed ; petioles 5·7·5 cm. *Fl.*—white and yellow, small, sessile or sub-sessile, in axillary and terminal panicle spikes ; calyx furnished with red glands ; stamens about 26. Ovary tomentose, 3-celled ; styles 3, thickly plumose. *Fr.*—capsule, ·9-1·3 diam., 3-lobed, 3-celled, 3-valved, covered with a red powder consisting of *Kesin* mixed with minute stellate hairs (Brandis). *Fl. t.*—Nov.-Jan. *Fr. t.*—Feb.-May.

DISTR. :—Throughout the State in dry and open thorn forests ; more common in the Konkan jungles and hills ; also in the Deccan and Gujarat. Throughout Tropical India : Sind, Ceylon, Malay Islands, China and Australia.

DESCR. OF WOOD :—*Colour* grey to light-red ; no heart-wood. Close-grained. *An. rings* indistinct. *Pores* small, uniformly distributed, scanty, often sub-divided. *Med. rays* uniform, very numerous, equidistant, the distance between them less than the diameter of the pores ; faint indications of transverse bars. Smooth, hard,. *Wt.*—47-54 lbs. per c.ft.

USES :—Wood used as fuel, handles of hoes ; suitable for match boxes, bobbins. The berries of this tree at a certain stage of their ripeness are really brown, but are covered with a thick coating of red dust. This dust is the *Kamala* of commerce. Roots (rarely), leaves, fruits and seeds are used medicinally. The leaves are not eaten by goats. Bark is occasionally used for tanning. The tree is important sylviculturally as it is a useful nurse to more important species and is a good soil improver.

See—Medicinal Plants, Dyes and Tans.

MANGIFERA INDICA Linn.

FAM.—Anacardiaceæ.

COM. NS. :—*E.* Cuckoo's Joy, Mango tree ; *G.* Ambo, Amri ; *H.* Am. ; *K.* Mavin-mara, Mavu, Rasala ; *M.* Amba ; *Tr.* Mango.

CHAR. :—A large evergreen tree 15-20 m. high, with girth upto 4.5 m. *Bark* thick, dark-grey, nearly black, rough with numerous small fissures and exfoliating scales. *L.*—coriaceous, oblong-lanceolate 12.5-25 × 3.5-7.5 cm., shining above. *Fl.*—monœcious in terminal panicles, pubescent. Calyx 4-5-partite, deciduous. Petals, 4-5, oblong with 3 orange-coloured ridges on the inner face. Stamens 4-5, only one fertile. *Fr.*—drupe, large, fleshy, sub-ovoid, 7.5-20 cm. long, stone compressed hard. *Fl. t.*—Feb.-Mar. *Fr. t.*—May.-June.

DISTR. :—common everywhere, wild and cultivated; rain forests of Konkan and N. Kanara ghats and the Satpudas; cultivated throughout the State; tropical Himalayas, Bhutan, Bihar, Khasia Hills, Sikkim, Western Peninsula from Khandesh southwards; cultivated throughout India for its fruit: Burma.

DESCR. OF WOOD :—*Colour* grey; in old trees sometimes dark-brown with black streaks. *Pores* scanty, moderate-sized and large, distinctly marked on the longitudinal section, often subdivided and sometimes joined by short concentric bands. *Med. rays* fine, wavy, closely packed, interrupted by or bent round the pores. Wood in old trees hard, in young ones coarse-grained and soft; seasons easily and retains its shape after seasoning. Fairly strong, not very durable in exposed positions; saws and works easily; finishes to a clean surface and takes a good polish. *Wt.*—42 lbs. per c.ft.

USES :—Wood used for planking, door and window frames, tea, opium and indigo boxes, packing cases, cheap furniture, dugout canoes, boats with their parts and ship-building, Masula boats (Madras), well-construction, sieve-frames, brush-backs, ploughs, yokes, cart-wheels, and cooper's work, occasionally used for railway carriage furniture. Good wood for dry cooperage and shoe-heels. Roots, leaves, flowers, fruits and seeds used medicinally. Fruits are eaten raw or ripe.

See—Medicinal Plants, Fruit Trees.

MANILKANA HEXANDRA Roxb.

(MIMUSOPS HEXANDRA, Roxb.)

FAM.—Sapotaceæ.

COM. NS. :—G. Rayan; H. Khir, Khirni; M. Khirni, Raini, Ranjana.

CHAR. :—A large evergreen ornamental, glabrous tree, 15-18 m. high, girth 3.6-4.5 m. Head shady, trunk erect without branches for a considerable height. *Bark* blackish-grey, deeply furrowed. *L.*—5-10 × 4.5 cm., obovate-oblong, notched at the end, narrowed at the base, sometimes crowded at the end of the branches, glabrous, shining above; petiole 1.3-2.5 cm. *Fl.*—white and yellow, not fragrant, .6 cm. diam., on solitary, axillary pedicels. Calyx segments 6. Corolla lobes two series, the outer consisting of 12 white and the inner of 6 yellow lobes. Stamens 12. *Fr.*—about 2.5 cm. diam., yellow when ripe, smooth, usually 1-seeded by abortion.

Seed compressed, oblong, about 1.3 cm. *Fl. t.*—Oct.-Dec. *Fr. t.*—ripe in Mar.

DISTR. :—Common in the dry forests of the Deccan, Khandesh and Gujarat, S. M. Country (Belgaum); Western Peninsula, cultivated in N. W. India : Ceylon.

DESCR. OF WOOD :—*Colour* red. Close and even-grained. *Pores* small, scanty, occasionally solitary but usually in short-radial lines which are echeloned at a distance in slanting fashion. *Med. rays* very numerous, fine uniform, equidistant. Transverse lines wavy, irregular, less prominent. Very hard, strong, durable, tough. *Wt.*—65 lbs. per c.ft.

USES :—Wood used for house-building, bridge-construction, bridge and wharf-piles, boats, agricultural implements, oil-presses, sugar-mills, carts, carriages, waggons, tool-handles and turning; very successfully employed in decorative house-fittings and furniture; gives an excellent fuel. Fruit is eaten and is said to be the chief article of food of poorer classes in Gujarat, during hot season. Leaves are fed to buffaloes.

See—Fruit Trees, Fodder Plants, Food Plants.

MAPPIA FCETIDA Miers.

FAM.—Olacaceæ.

COM. NS. :—K. Hedare, Kodsa; M. Gur, Kalgur, Ganera.

CHAR. :—A large shrub or a small tree, easily recognised when in flower by the strong foetid smell. *Bark* greenish-grey, rough. *L.*—10.5 × 5.9-8 cm., elliptic-oblong, acuminate at the apex, acute at the base, distinctly veined, glabrous on a petiole 2.5-4.6 cm. *Fl.*—yellowish-white, small, very foetid, pilose, on short pedicels, arranged in terminal, lax, pubescent cymes. Calyx segments 5. Petals 5. Stamens equal in number, alternate with petals. Ovary 1-celled, with 2 pendulous ovules. *Fr.*—a drupe, 2 cm., ovoid, succulent, purple when ripe. *Fl. t.*—at different times, usually Aug. *Fr. t.*—hot season.

DISTR. :—Western Peninsula from the Konkan southwards. Common on the Konkan and N. Kanara ghats, mostly in moist evergreen forests; abundant at Mahabaleshwar: Goa, Travancore, Ceylon.

DESCR. OF WOOD :—*Colour* white or greyish. *Pores* undersized to large, scanty, in radial strings. *Med. rays* numerous, broad, prominent in the silver-grain. Cells easily seen under the lens.

USES :—Leaves used medicinally in cattle diseases.

MASTIXIA PENTANDRA Blume.

FAM.—Cornaceæ.

COM. NS. :—No common names.

CHAR. :—A moderate-sized tree. *Bark* smooth. *L.*—10-15 × 4-5 cm., alternate, elliptic-oblong, acute or suddenly acuminate, narrow at the base, glabrous, coriaceous, entire, dark-green,

becoming dark on drying. *Fl.*—small, white, in terminal pubescent panicles. Calyx campanulate, segments 5, triangular-lanceolate. Petals 5, ovate-acute, leathery. Stamens 5, alternate with the petals. Ovary adhering to tube of calyx, 1-celled. *Fr.*—drupaceous, ovoid, size of a plum. *Fl. t.*—Jany.-May. *Fr. t.*—cold season.

DISTR. :—Western ghats from Bombay southwards ; Konkan and N. Kanara in evergreen forests ; Western Peninsula.

DESCR. OF WOOD :—*Colour* white. *Pores* small, or moderate-sized, evenly distributed. *Med. rays* fine, numerous. Soft, shining. *Wt.*—28 lbs. per c.ft.

USES :—Not known.

MELANTHESA TURBINATA Wt.

(BREYNIA PATENS Benth.)

FAM.—Euphorbiaceæ.

COM. NS. :—*M. Kangli*.

CHAR. :—A shrub or a small tree with spreading branches, branchlets slender, angular. *Bark* smooth, thin, grey. *L.*—1.3-2.5 cm., distichous, oval-obtuse or almost orbicular, entire, short-petioled, sometimes unequal-sided. *Fl.*—small, greenish, short-pedicelled, axillary, solitary or by pairs. *Male* calyx turbinate, 6-lobed ; *female* calyx 6-lobed enlarging with the fruit ; styles 3, 2-lobed. *Fr.*—capsule, size of a pea, rather dry and red when ripe, supported by the enlarged red calyx. *Fl. t.*—Apr.-June ; *Fr. t.*—Aug.-Sept.

DISTR. :—Throughout the Konkan and N. Kanara ghat forests. Tropical Himalayas, from Nepal to Mishmi hills, and Assam. Western Peninsula. Burma, Ceylon. Chiefly in dry scrub forests.

DESCR. OF WOOD :—*Colour* white. Close-grained. *Pores* small, regular, evenly distributed. *Med. rays* moderately hard, regular, long, wavy, conspicuous. Hard.

USES :—Not available.

MELIA AZEDARACH Linn.

FAM.—Meliaceæ.

COM. NS. :—*E. Bastard-cedar*, *Bead tree*, *Persian Lilac* ; *G. Bakan Limbado* ; *H. Bakain*, *Betain*, *Diekna*, *Drek* ; *K. Bevu*, *Chickbevu*, *Heb-bevu*, *M. Padrai*, *Pejri*.

CHAR. :—A deciduous tree, 12-15 m. high, girth 1.8-1 m. *Bark* grey or greyish-brown, with long shallow vertical fissures. Young parts and inflorescence minutely puberulous. *L.*—23.4-48.8 cm. long, bipinnate, occasionally tripinnate, with or without an odd one, opposite, sub-opposite or alternate. *L.*—47.8 × 1.34-3.2 cm., ovate or lanceolate, unequal, acuminate at the apex and more or less oblique at the base, serrate or entire at the upper end, very shortly petioluled. *Fl.*—usually 5-merous, pale lilac, small, honey-scented, on short, slender pedicels, in solitary, more or less puberulous

axillary panicles, shorter than the leaves. *Calyx* deeply cleft, lobes oblong-lanceolate. Petals puberulous. Staminal tube purple, glabrous outside, many-toothed at the tip. Ovary 5-celled. Stigma 5-furrowed. *Fr.*—drupe, sub-globose, yellow when ripe, with 5 or fewer cells and seeds. *Fl. t.*—Feb.-Mar., sometimes throughout the year. *Fr. t.*—Mar.-Apr. Sheds leaves Feb.-Apr.; new leaves end of hot season.

DISTR. :—Commonly cultivated throughout India. Indigenous in the Jhelum valley in Kashmir. Said to grow wild in sub-Himalayan tract; also wild in Baluchistan, Burma and Indian Archipelago.

DESCR. OF WOOD :—*Colour* sap-wood yellowish-white; heart-wood red. Loose-grained. *An. rings* marked by a broad belt of large pores, the outer-part of each an. ring containing a few smaller sized pores, which are joined by irregular, wavy, concentric bands of soft tissue. *Med. rays* moderately broad; visible in the silver-grain as long rough plates. *Pores* very prominent on a longitudinal section, filled afterwards with resin. Soft, light, handsome; takes an excellent polish. *Wt.*—38 lbs. per c.ft.

USES :—Wood bark and seed-oil are used for the same purposes as those of *Azadirachta indica*. Strings of seed-stones are used for rosaries and necklaces and as charm against diseases.

See—Medicinal Plants, Oils.

MELIA COMPOSITA Willd.

FAM.—Meliaceæ

COM. NS. :—G. Kadu-kajar; K. Betta-bevu, Heb-bevu, Kari-bevu; M. Limbara, Nimbara.

CHAR. :—A large deciduous tree, 12-18 m. high; girth 1.3-2.8 m. *Bark* rather rough, dark-brown, thin, scaly, exfoliating in thin narrow strips, with broad, shallow longitudinal cracks; inner bark reddish. Young shoots, petioles and panicles mealy with stellate hairs. *L.*—23.4-62.4 cm. long, bi-tri-pinnate; pinnae 3-7-foliolate. Leaflets 2.6-7.8 × .7-4 cm., ovate or oblong-lanceolate, acuminate at the apex and somewhat oblique at the base, entire or crenulate, glabrous. *Fl.*—white, odorous, arranged in panicles. *Calyx* divisions 5, ovate-oblong; petals 5, linear-lanceolate. Staminal tube white, villous. Ovary 5-celled. *Fr.*—drupe, ovoid, size of a plum, with 5 or fewer cells and seeds by abortion. *Fl. t.*—Mar.-Apr. *Fr. t.*—rainy season upto Jan.

DISTR. :—In the evergreen and deciduous forests of the Konkan and N. Kanara ghats (common on Supa ghat), E. & W. Peninsulas, Sikkim Himalayas upto 1,800 m., Khasia hills; Burma, Ceylon, Indian Archipelago, Australia and Angola (W. Africa). Also planted.

DESCR. OF WOOD :—*Colour* sap-wood grey; heart-wood reddish-white. *Pores* large, generally round, visible on a vertical section. *Med. rays* white, fine, scanty, prominent in silver-grain. The structure resembles that of Toon, but all the pores are of the same size and the wood is softer. *An. rings* are marked by more

numerous, but not larger pores. Soft, light; not easily attacked by white-ants; not so strong and durable as Neem. *Wt.*—27 lbs. per c.ft.

USES :—Wood used for cigar-boxes and musical instruments in N. Kanara; outriggers of native-boats in Ceylon. Suitable for tea-boxes. Drupes, sold in the bazar as Khadu-khajura, are bitter, said to be used medicinally. Seeds are said to taste like almonds.

MELOCHIA UMBELLATA Stapf.

(**MELOCHIA VELUTINA** Bedd.)

FAM.—Sterculiaceæ.

COM. NS. :—*M. Methuri*.

CHAR. :—A tall shrub or a small tree 6-9 m. high. Young parts stellate-pubescent. *Bark* grey, rough, with small horizontal fissures. *L.*—10·4 × 7·8 cm. or larger, suborbicular, subcordate, acuminate, 5-7 nerved, more or less deeply serrate, thinly stellate-pubescent or glabrescent above, softly velvety-tomentose beneath. Petiole long, tomentose. Stipules leafy, broadly-cordate, more or less pubescent. *Fl.*—small, pale, rose-coloured, on very short, tomentose pedicels, arranged in terminal and axillary, many-flowered, corymbose panicles. Calyx campanulate, 5-lobed; lobes connate to about the middle, greyish, tomentose. Petals 5, twice the length of the sepals. Stamens 5, opposite to the petals, united at the base into a short tube, and inserted into a lobed disc.; filaments flat; anthers introrse, 2-celled. Ovary sessile 5-celled. Styles 5, free, or connate at the base. *Fr.*—capsule, oblong, 1·34 cm., deeply 5-lobed, hirsute. Seeds solitary in each cell, brown, smooth, with a wing at the upper extremity. *Fl. t.*—cold season. *Fr. t.*—hot season, when leaves are partially shed.

DISTR. :—This ornamental flowering tree is cultivated in gardens throughout India, from N. W. Provinces to the Konkan. It is found in wild State in hotter parts. In the Bombay State it is found wild at Bassein, Khandala and Belgaum.

DESCR. OF WOOD :—*Colour* sap-wood light brown, heart-wood light red. *Pores* large, sub-divided radially into 2 or 3, or single. *Med. rays* moderately broad, numerous, with a silver grain of narrow horizontal plates. Even-grained, very light and soft.

USES :—Used for toys.

MESUA FERREA Linn.

FAM.—Guttiferæ.

COM. NS. :—*E.* Assam or Ceylon Iron Wood; *H.* Naghas, Nag-kesara; *K.* Nag Kesar, Nagsampige; *M.* Nag-champa; *Tr.* Mesua.

CHAR. :—A large evergreen glabrous tree, 15-18 m. high with a girth of about 1·8-2·1 m. Trunk straight, branches slender, obsoletely 4-angled. *Bark* 67 cm. thick, reddish brown, peeling off in flat, thin flakes, having a slightly roughened surface. *L.*—very variable in size, usually 7·8-15·6 × 4·4-8 cm., linear-lanceolate or oblong-lanceolate, acute or acuminate at the apex, acute or

rounded at the base, rigidly coriaceous, glabrous, dark-green and shining above, covered more or less with fine white tomentum or glaucous beneath; veins very fine, numerous, close-set, inconspicuous. *Fl.*—large, 2-2.8 cm. in diam., pure white, fragrant (the fragrance partaking of rose and violet), usually terminal, and solitary or in pairs. Sepals 4, rotundate, fleshy, velvety with membranous margins, inner pair largest. Petals 4, spreading, broadly obovate. Stamens numerous, free or connate at the base. Anthers large, golden-yellow, 2-celled, dehiscing vertically. Ovary 2-celled. Style long, with a peltate stigma. *Fr.*—drupe, of a variable size, often the size of a pigeon's egg, ovate, acuminate, striate, the base surrounded by the persistent sepals. Seeds 1, rarely 2-4, dark-brown, smooth. *Fl. t.*—Feb.-Mar. *Fr. t.*—May-June. A very variable species as regards the size of the flowers, width of the leaves, and the amount of white mealy covering underneath and quality of wood.

DISTR. :—Throughout the evergreen rain-forests of N. Kanara and S. Kanara, S. Konkan, Mountains of E. Bengal, E. Himalayas, E. and W. Peninsulas, and the Andamans; Ceylon; often cultivated on account of its flowers. Isolated trees are occasionally found in bloom in the tropical evergreen forests and covered with a mass of scented white and yellow flowers, looking like pyramids and surrounded by myriads of winged insects.

DESCR. OF WOOD :—*Colour* sap-wood creamy white, heart-wood red. *Pores* moderate-sized, scanty, often filled with yellow resin, single or grouped, or in oblique strings of varying length. *Med. rays* extremely fine, uniform, equidistant, very numerous. Many fine, wavy, concentric lines of dark-coloured tissue, regular and prominent, but of very different lengths. Medium texture and straight or interlocked grain. Hardest and strongest wood in India, fairly durable; an admirable timber for use where very great hardness and strength are required. Slow and difficult to season; prone to surface cracking, warping and splitting, if not carefully handled. Difficult to saw; should be sawn green; requires a good deal of work with tools to bring to a good surface. *Wt.*—62 lbs. per cft.

USES :—It is not a workshop wood and is normally used for rougher work after being rough sawn or adzed to shape. Used for bridge-construction, railway sleepers, piles, house-building (posts, beams and thick scantlings), heavy furniture, carts, axles, yokes, shafts, ploughs, dug-out canoes, helms, oars, masts, wells, mining construction, suitable for trial for road paving-blocks and block-flooring in godowns and mills. Flowers yield a strong perfume. The fruit is edible. Seeds yields a dark-coloured oil used for burning and also medicinally.

See—Medicinal Plants, Oils, Fruit Trees.

MEYNA LAXIFLORA Robyns.

(**VANGUERIA SPINOSA** Roxb.)

FAM.—Rubiaceæ.

COM. NS. :—K. Gober-gally, Gund or Malla-kare; M. Alu, Halawni, Huloo.

CHAR. :—A large shrub or a small tree, armed with straight opposite, simple or 3-nate sharp spines. *Bark* dark-coloured, nearly smooth, or with shallow fissures; inner bark with 5 or 6 alternate layers of white and red tissue. *L.*—7·5-10 cm., opposite or 3-nately whorled, entire or membranous, ovate, elliptic or ovate-oblong, acute or acuminate, glabrous or tomentose. *Fl.*—small, greenish, very short-pedicelled, arranged in shortly peduncled cymes. Calyx 5-toothed. Stigma 4-5-lobed. *Fr.*—drupe, 2-2·5 cm. diam., globular or terminate, yellowish, fleshy. Pyrenes 4-5, smooth. *Fl. t.*—Jan.-Apr. *Fr. t.*—rainy season.

DISTR. :—Common in the deciduous forests of N. Kanara and Belgaum Dist., Konkan, Matheran, Lonavala (Mawal), W. Peninsula, N. Bengal : Burma, Pegu, Java.

DESCR. OF WOOD :—*Colour* pinkish-brown or white. Close-grained. *An. rings* distinct. *Pores* small, numerous. *Med. rays* numerous, fine and very fine. Moderately hard and heavy. *Wt.*—55 lbs. per c.ft.

USES :—Fruit eaten, but not palatable. Leaves are fed to cattle. *See*—Fruit Trees, Fodder Plants.

MICHELIA CHAMPACA Linn.

FAM.—Magnoliaceæ.

COM. NS. :—*E.* Golden Champo; *G.* Champo, Rac Champo; *H.* Champa; *K.* Champige, Sampige; *M.* Sonechapha; *Tr.* Champ.

CHAR. :—A large evergreen tree, 9-18 m. high (in favourable places up to 30 m.). *Bark* grey, smooth, 1·3 cm. thick. *L.*—ovate, pointed, wavy, 20-26 cm. long, nearly glabrous when full grown. *Fl.*—strongly scented, yellow or orange, shortly pedunculate about 5·2 cm. across. Perianth leaves 15-20. *Fr.*—spike, compact 7·8-15·6 cm. long. Carpels ovoid, blunt, lenticulate. Seeds brown. *Fl. t.*—all the year round, but chiefly in May.

DISTR. :—Cultivated all over the State; wild in the Western Ghats. Cultivated in the moister parts of India and Burma. Wild in Nepal, Sikkim, Eastern Himalayas, Assam, Burma and the Southern parts of the Peninsula.

DESCR. OF WOOD :—*Colour* sap-wood white; heart-wood light olive-brown. *An. rings* distinctly marked by a dark line. *Pores* moderate-sized, evenly distributed, often sub-divided into 2 to 5 by thin partitions. *Med. rays* regular, fine and moderately broad, numerous, showing a satiny silver grain. Excellent light-weight wood. Soft and even-grained. Usually not very durable. Wood dries quickly; kiln-seasoning presents no difficulties, but is inclined to become dull during the process of drying. It turns well, takes stain and polish nicely. *Wt.*—31-34 lbs. per c.ft. (air-dry).

USES :—Excellent timber for light furniture, household fittings and air-planes. House-building (chiefly planking and door panels), furniture, carriage-building, yokes, dug-out canoes, oars, ploughs, carving, turning, bent-wood work. Wood is made into beads and

necklaces. Bark, flowers and seeds used medicinally. Flowers are used in religious ceremonies.

See—Medicinal Plants, Sacred Plants, Oils.

MILLINGTONIA HORTENSIS Linn.

FAM.—Bignoniaceæ.

COM. NS. :—*E.* Indian Cork-tree ; *K.* Biratu ; *H.* & *M.* Akashnim, Nimi Chambeli, Kavla-nim.

CHAR. :—A tall handsome evergreen fast-growing tree. 15-18 m. high (sometimes more) ; girth 1·8-3·6 m. *Bark* corky. *L.*—3-7·5 m. long, opposite decompound ; leaflets 2·5-7·5 cm., ovate-acuminate, rounded or obtuse at the base, entire, membranous, dark-green ; petioles of the lower pinnæ and pinnules long, the upper pinnules sessile or sub-sessile. *Fl.*—numerous, 7·5-8 cm. long, pure white, fragrant, in ample terminal panicles. *Fr.*—capsule, smooth. Seeds (which are rarely met with on this side) about 2·5 cm. in diam., flat, surrounded by a pellucid wing. *Fl. t.*—Sept.-Dec. *Fr. t.*—Mar. Tree is very brittle and liable to be damaged by storms. It produces quantities of suckers from the roots, which are used for propagation.

DISTR. :—Cultivated along road-sides and parks throughout the State. Believed to be indigenous in Burma and the Malay Archipelago.

DESCR. OF WOOD :—*Colour* yellowish-white, even-grained. *An. rings* marked by autumn wood with few pores and a spring wood with rather more numerous ones. *Pores* small, numerous, arranged in light coloured patches which run together to form a more or less concentric zigzag pattern. *Med. rays* fine, the distance between the rays somewhat larger than the transverse diameter of the pores. A good grain on a vertical section. Soft, gets discoloured if it is not cut up fresh and very carefully seasoned ; takes a fine polish. *Wt.*—38 lbs. per c.ft.

USES :—Wood used for brush-backs ; would do admirably for tea-boxes and similar uses. Wood is well adapted for furniture and ornamental work (Beddome). From the bark an inferior kind of cork is made.

MIMUSOPS ELENGI Linn.

FAM.—Sapotacææ.

COM. NS. :—*G.* Baphuli, Borsalli, Vareuli ; *H.* Bakul, Bolsari, Mulsari ; *K.* Bakul, Kalhale, Mugule, Manjale ; *M.* Bakul, Vavali.

CHAR. :—A large glabrous evergreen tree, 12-15 m. high ; girth 1·2-2·1 m., head compact, leafy ; trunk erect. *Bark* grey, rough, deeply cracked with vertical and transverse fissures ; young shoots and pedicels shortly rusty-pubescent. *L.*—7·5-10 × 2·5-4 cm. entire, smooth, coriaceous, shining, glabrous, elliptic-oblong, acuminate, on a petiole 1·3-2 cm. *Fl.*—white, very fragrant, about 1·5 cm. diam., in axillary fascicles of 2-8, on drooping tawny pedicels 4-6 lin. Calyx segments 8. Corolla lobes three times as many as sepals : the outer series consists of 16 (occasionally 12), the inner of 8

(occasionally 6) lobes. Stamens 8. *Fr.*—berry, about 1.3-2.5 cm., yellow when ripe, smooth, edible, 1-seeded by abortion. *Fl. t.*—Jan.-Apr. *Fr. t.*—about the end of rains.

DISTR. :—Evergreen forests; common in the rain-forests of N. Kanara and the Konkan; often planted in gardens; Western Peninsula: Ceylon, Malaya; cultivated in the tropics.

DESCR. OF WOOD :—*Colour* sap-wood reddish-brown, heart-wood dark-red. Close and even-grained. *Pores* small, in short lines which are generally radial, but often irregular and oblique. *Med. rays* very fine, very numerous, uniform and equidistant. Many parallel, wavy, concentric bands, narrow but conspicuous. Very hard; one of the strongest woods as resistance to shearing and bending; heavy, durable; takes a good polish. *Wt.*—60 lbs. per c.ft.

USES :—Wood used for house-building, bridge-construction; piles, carts, naves of wheels, boats, rice-pounders, cabinet-work, walking sticks; gives excellent fuel. Roots, bark, flowers, fruits and seeds are used medicinally. Fruit is eaten. Seeds give oil which is used in cooking, for lighting and in medicine. Fragrant flowers are used for making garlands and for distilling perfume.

See—Medicinal Plants, Fruit Trees, Oils.

MIMUSOPS KAUKI Linn.

FAM.—Sapotaceæ.

COM. NS. :—*E.* Obtuse-leaved Minusops, Adam's Apple tree; *H.* Khirmi; *M.* Kauki, Khirmi.

CHAR. :—A beautiful evergreen tree, 9-12 m. high; girth 9-1.2 m. Branches numerous, round, spreading horizontally. *L.*—6.3-10 cm., clustered at the ends of the branches, elliptic-ovate or obovate, obtuse or retuse, entire, coriaceous, dark-green, shining above, white or ash-white beneath, nerves parallel, prominent beneath. *Fl.*—white with a purple tinge, small on solitary, axillary, recurved pedicels about as long as the petiole. Calyx divisions 6 in two series, slightly downy. Corolla lobes in two series 12 outer, 6 inner. *Fr.*—berry, oval or obovate, purple when ripe, crowned with persistent style, 1-seeded by abortion, 2.5-4 cm. long. Seed triangular, compressed, of a light purplish colour. *Fl. t.*—hot season. *Fr. t.*—Aug.-Sept; fruit remaining on the tree for a long time.

DISTR. :—Rarely cultivated in the Bombay State; also cultivated in Malabar, Cochin and Bengal. Native of Eastern Archipelago and Australia.

DESCR. OF WOOD :—*Colour* light brown.

USES :—From an incision in the bark a viscid gummy juice exudes which may probably be converted into an inferior sort of "Gutta Percha". Seed gives oil (Burma). Fruit is slightly acid and is eaten; it is said to increase appetite.

See—Gums and Resins, Fruit Trees, Oils.

MITRAGYNA PARVIFLORA Korth.
(**STEPHEGYNE PARVIFLORA, Kort.**)

FAM.—Rubiaceæ.

COM. NS. :—*H.* Kaddam, Kallam, Keim, Kangei ; *K.* Attaka, Kadawar, Nanu, Kudwal, Yctega ; *M.* Kadam, Kalamb.

CHAR. :—A large deciduous tree, 12-24 m. high ; girth 1·8-3·6 m. Bark light grey, smooth, with shallow depressions left by exfoliating scales. *L.*—usually 5-15 cm., extremely variable in size, rotundate, oblong, ovate, or obovate, cordate at the base, on short petioles, obtuse, acute or acuminate, deciduous. *Fl.*—small, yellow, sessile, in dense heads, about 1 in. diam., on peduncles 1·3-7·5 cm. supported by 2 linear-oblong leaflike bracts, arranged in terminal and axillary panicles. *Fr.*—capsule, small, ovoid. *Fl. t.*—May-Aug. *Fr. t.*—Nov.-Dec. Leafless for a short time Feb.-Mar.

DISTR. :—Throughout the State in deciduous forests, Konkan and Mawal districts. Throughout India : Burma, Ceylon.

DESCR. OF WOOD :—*Colour* light pinkish-brown. Even-grained. Pores small, numerous, uniformly distributed. *Med. rays* very fine, numerous, short. Moderately hard ; durable if not exposed to wet ; easily worked ; takes a good polish. *Wt.*—45 lbs. per c.ft.

USES :—Wood used for buildings, furniture, agricultural implements, combs, cups, spoons, platters and for turned and carved articles. Leaves are used as fodder.

See—Fodder Plants.

MORINDA CITRIFOLIA Linn.

FAM.—Rubiaceæ.

COM. NS. :—*E.* Indian mulberry ; *G.* Al, Saraoji ; *H.* Al, Ach ; *K.* Ainshi, Mulgule, Tagase ; *M.* Bartondi.

CHAR. :—A small glabrous tree, trunk straight, 3·6-4·5 m. high ; girth 3·6 m. ; branchlets obtusely 4-angled. Bark smooth, yellowish-white. *L.*—usually 15-25 cm., short-petioled, shining, oval-oblong or broadly elliptic, acuminate, acute or obtuse, one of the pair next the peduncle often absent. Stipules large, broader than long or semilunar, entire or 2-3 fid. *Fl.*—white, small, fragrant, in globose heads ; peduncles 2·5 cm. long or more, solitary, leaf-opposed, bracteate. Bracts few, foliaceous. *Fr.*—smooth, glossy, white when ripe, about the size of a small egg. *Fl. t.*—May-Junc. *Fr. t.*—rainy season.

Var. bracteata—Anthers included within the hairy mouth of the corolla tube. Calyx limb with a lanceolate or spatulate white foliaceous lobe.

DISTR. :—Cultivated in the State, especially in Khandesh and near Pandharpur. *Var. bracteata* common along the coast of the Konkan, quite near the sea and certainly indigenous, cultivated widely in many places throughout India, Burma, China, Formosa.

DESCR. OF WOOD :—Same as *M. tinctoria*.

USES :—Same as *M. tinctoria*. Roots, leaves and fruits used medicinally.

See—Medicinal Plants, Dyes, Oils.

MORINDA TINCTORIA Roxb, Var. **TOMENTOSA** Hook. f.

FAM.—Rubiaceæ.

COM. NS. :—G. Alleri, Alladi; H. Al, Ach; K. Mulgal; M. Al, Ainshi.

CHAR. :—A tall shrub or a small tree, 4·5-6 m. high, girth ·3-·6 m.; branchlets 4-angled, tomentose. *Bark* corky, brittle, brown or grey, with numerous deep, longitudinal cracks. *L.*—10-15 × 5-7·5 cm., broadly-ovate, or ovate-oblong, acuminate, tapering into a short, thick, tomentose petiole, entire, membranous, pubescent on both sides, stipules bifid. *Fl.*—white, sessile, on a globular head; peduncle 1·3-2·5 cm., leaf-opposed, tomentose, solitary, axillary, larger than the petiole, or sometimes several together at the end of the branchlet. Calyx truncate. Corolla campanulate, tomentose. *Fr.*—globose or ovoid, about 2·5 cm. diam. *Fl. t.*—Apr.-May. *Fr. t.*—June-July.

DISTR. :—Dry forests of the Deccan (Poona, Sholapur), S. M. Country (Gokak, Badami); Kanara; throughout the greater part of India south of the Gangctic plain, Bengal, Assam: Burma, Ceylon.

DESCR. OF WOOD :—*Colour* red, often yellow with red-streaks. Close-grained. *An. rings* faintly marked. *Pores* small, scanty, in radial or oblique groups, rather distant from each other. *Med. rays* fine, and moderately broad, rather distant. Moderately hard, durable. *Wt.*—about 41 lbs per c.ft.

USES :—Wood used for gun-stocks, yokes, combs, plates and similar utensils. The root yields a valuable dye.

See—Dyes and Tans.

MORINGA CONCANENSIS Nimmo.

FAM.—Moringaceæ.

COM. NS. :—Same as *M. Oleifera*.

CHAR. :—A tree very similar to *Moringa Oleifera*, but distinguished from it by having very much larger leaves and rounded leaflets which are often retuse and have much more powerful odour of horse-radish. *Fl.*—yellowish, streaked with pink. Perfect anthers 5; abortive anthers 5, much smaller. Seeds 1·3 cm. long, very broadly trigonous with membranous wings. *Fl. t.*—Nov.-Dec. *Fr. t.*—Dec. onwards.

DISTR. :—Konkan (Thana dist.), Rajasthan, Sind.

DESCR. OF WOOD :—*Colour* white. *Pores* large, often subdivided, enclosed in white rings, scanty. *Med. rays* fine, numerous, the distance between them less than the diameter of the pores. Soft, corky, light. *Wt.*—18 lbs. per c.ft.

USES :—Wood not used.

MORINGA OLEIFERA Lam.

(MORINGA PTERIGOSPERMA Gaertn.)

FAM.—Moringaceæ.

COM. NS. :—*E.* Drum-stick tree, Indian horse-radish ; *G.* Sargavo, Seglo ; *H.* Ganjna, Senjana, Senja ; *K.* Kochka, Nuggi ; *M.* Shevga, Shekat.

CHAR. :—A tree, 4·5-7·5 m. high, girth 1·2-1·5 m. *Bark* 2·5 cm. thick, grey, corky, with longitudinal cracks. Young parts tomentose. *L.*—3·6 in. long, alternate, twice or usually thrice pinnate ; petiole sheathing at the base ; pinnæ 4-6 pairs. Pinnules 6-9 pairs, opposite, elliptic, ovate, or obovate on slender petiolules ; glands between each pair of pinnæ. *Fl.*—2·5 cm. diam., white, honey-scented, arranged in panicles spreading at the ends of branches. Sepals linear-lanceolate. Petals linear-spathulate. Fertile filaments hairy at the base. Ovary villous. *Fr.*—pod, 23-46 cm., pendulous, with 9 longitudinal ribs. Seeds 3-gonous, winged at the angles. *Fl. t.*—Jan.-Apr. *Fr. t.*—Apr. onwards. Sheds leaves Dec.-Jan. New leaves—Mar.-Apr.

DISTR. :—Wild in the sub-Himalayan tract from the Chenab to the Sarada ; also in Cutch forests. Cultivated in fields and gardens all over the State, and throughout India : Burma and Ceylon.

DESCR. OF WOOD :—*Colour* white. Wood cells large, prominent. *Pores* large, scanty, often sub-divided or in short radial sections of two or three. *Med. rays* short, fine to moderately broad, the distance between them less than the transverse diameter of the pores, so that they bend when they pass the pores. Soft, spongy, perishable, light. *Wt.*—19 lbs. per c.ft.

USES :—Wood is useless. Root, bark and gum from trunk used medicinally. Tender leaves, flowers and fruits used as vegetables. Seeds yield an oil (Ben-Oil) said to be used as salad ; it is also used by watch-makers for lubricating watch machinery. Twigs and leaves form a good fodder.

See—Medicinal Plants, Food Plants, Oils, Fodder Plants, Gums and Resins.

MORUS ALBA Linn.

FAM.—Moraceæ.

COM. NS. :—*E.* White Mulberry ; *H.* Chinni, Chun, Tul, Tulklu, Tut ; *M.* Tuti ; *Tr.* Mulberry.

CHAR. :—A small or moderate-sized deciduous glabrous tree, 9-12 m. high ; girth 1·2-2·4 m. *Bark* brown, rather rough. Branchlets, petioles and underside of leaves slightly pubescent. *L.*—5·7·5 cm., ovate, acute or acuminate, cordate at the base, dentate or variously lobed, 3-nerved, petiole 1·3-2·5 cm. long. *Fl.*—monoecious, the male and the female often on distinct branches. *Fr.*—colour various from white to purple. *Fl. t.*—Mar.-Apr. *Fr. t.*—rainy season. Sheds leaves during the cold season ; renews leaves Feb.-Apr.

DISTR. :—Cultivated in gardens in the State; cultivated in Northern India and upto 3,300 m. in the Himalayas. Indigenous in Northern and Western Asia.

DESCR. OF WOOD :—*Colour* sap-wood white; heart-wood yellow or yellowish-brown, darkening on exposure. *An. rings* marked by a conspicuous belt of moderate-sized and large pores, often sub-divided and usually in two or three rows, in the spring wood; pores in the rest of the wood scanty getting gradually smaller outwards, more or less in concentric lines. *Med. rays* fine to moderately broad, rather numerous, giving a partly silver-grain. Hard, no odour, no taste, straight-grained and of rather open medium coarse texture; in shock resistance, shear and hardness it is considerably higher than teak; seasons easily but has a tendency to warp; moderately durable; easy to saw and work to a clean finish; can be carved and turned to a smooth surface; excellent wood for steam-bending. *Wt.*—45 lbs. per c.ft.

USES :—Wood used for buildings, boats, furniture, agricultural implements. It is a wood admirably suited for sports goods such as hockey-sticks, tennis rackets, where its shock resisting ability and high shear quality can be used to advantage. This is the chief mulberry used for silkworms in the Punjab and Kashmir. It is also grown for the sake of its fruit, which is sweet and succulent. It is also grown as a roadside and avenue tree, but is not altogether satisfactory as it does not live long and soon becomes ragged in the crown and unsightly.

See—Fruit Trees, Fibres.

MORUS INDICA Linn.

FAM.—Moraceæ.

COM. NS. :—*E.* White-mulberry; *G.* Shetur; *H.* Shetur, Siatut, Tut, Tulri; *K.* Kambati, Karihannu; *M.* Ambat, Tut.

CHAR. :—A deciduous shrub or a small tree, 6-7.5 m. high, girth 40-45 cm. Glabrous, young parts sparingly pubescent. *L.*—5-12.5 cm. on petiole 1.3-5 cm. long, ovate, acuminate, coarsely and unequally serrate, sometimes lobed, 3-nerved. *Fl.*—male spikes 1.3 cm long, axillary, on slender peduncles. Female spikes shorter, on slender peduncles. *Fr.*—globose or ovoid, small, purplish-black. *Fl. t.*—Mar.-June. *Fr. t.*—June-Aug.

DISTR. :—Wild and cultivated; very sparingly cultivated in the Deccan; common about villages in N. Kanara. Wild in sub-Himalayan tract from the Sutlej eastwards; outer hills of the Punjab and the valley of Sikkim. Cultivated largely in Bengal and Burma and sparingly in W. Peninsula.

DESCR. OF WOOD :—*Colour* yellow often with darker streaks, turning orange-brown on exposure; sap-wood white. Close-grained. *An. rings* distinctly marked by a belt of perhaps two or three rows of closely packed, moderate-sized and large pores which are generally sub-divided. The *pores* in the outer portion of the an. ring are small, scattered in small, somewhat concentric groups, uniformly distributed. *Med. rays* moderately broad, short, giving a handsome

silver-grain of shining narrow plates. Hard. Wt.—43 lbs. per c.ft. The timber is of good quality.

USES:—Wood used for house-building, furniture, tea-boxes, sporting requisites (cricket-stumps, bails, hockey-blades, tennis and badminton rackets and bat presses). Leaves are used for feeding silkworms. (It was formerly cultivated in Ahmednagar, Poona and Bombay for this purpose). Root, bark, leaves and fruit are used medicinally. Fruits are eaten fresh or made into preserves or syrups.

See—Medicinal Plants, Fruit Trees, Fibres.

MORUS LÆVIGATA Wall.

FAM.—Moraceæ.

COM. NS.:—*H. Tut*; *Tr. Mulberry*.

CHAR.:—A middle-sized tree. Young shoots, stipules and bud-scales with long soft hairs. *L.*—ovate, acuminate, finely serrate, often cordate, 7.5-17.5 cm. long, petiole 2.5-4 cm. long. *Fl.*—spikes drooping; male very hairy; female nearly glabrous. *Fr.*—long, cylindric, yellowish-white, sweet but insipid. *Fl. t.*—Nov.-Feb. *Fr. t.*—hot season.

(This tree reaches 30 m. in height with a girth of 4.5 m. in the Eastern Himalayas).

DISTR.:—Cultivated in gardens at Dharwar and probably elsewhere in the State. Wild and cultivated in the Himalayas from the Indus to Assam upto 1,200 m., Bengal: Burma.

DESCR. OF WOOD:—*Colour* yellow with yellowish-brown heart-wood. Close-grained, with a beautiful lustre, darkening on exposure to reddish brown. *An. rings* marked by a white line, and sometimes by a continuous string of pores. *Pores* rather scanty, uniformly distributed, moderate-sized to large, often oval and subdivided, each pore in a narrow ring of soft tissue, prominent on a vertical section. *Med. rays* fine and moderately broad; the distance between the rays generally larger than the transverse diameter of the pores. *Med. rays* prominent on a radial section, giving the wood a marked silver grain. Hard. Not difficult to season but has a tendency to warp. Rather strong, moderately durable; easy to saw and work to a clean finish; good for carving and turning; excellent for steam-bending. Wt.—40 lbs. per c.ft.

USES:—Same as *M. alba*.

MUNDULEA SUBEROSA Benth.

FAM.—Papilionaceæ.

COM. NS.:—*K. Min-bundati*; *M. Supti*.

CHAR.:—A small tree; very ornamental when in flower; trunk erect, short. *Bark* thick, corky, yellow. Young parts, pedicels, and underside of leaves white tomentose. *L.*—unequally pinnate, 15.5-23 cm. Leaflets 13-21, 4.5 × 7 cm., opposite, sub-opposite

or alternate, elliptic-oblong or oblong-lanceolate, obtuse and sometimes mucronulate, coriaceous. *Fl.*—large rose-coloured, on short pedicels, arranged in terminal racemes. Calyx campanulate, 5-toothed. Corolla 2.2-5 cm. Stamens monodelphous. Ovary sessile; stigma capitate. *Fr.*—legume, 8-10 cm. densely silky, irregularly contracted between the seeds; 6-8 seeded. *Fl. t.*—July-Sep. *Fr. t.*—Oct.-Nov.

DISTR. :—Dry forests of the Western Peninsula; Konkan; on the rocky hills east of Belgaum; common in the forests near Badami; Ceylon, Tropical Africa.

DESCR. OF WOOD :—*Colour* yellow, rather darker in the heart. Close-grained, much resembling satin-wood. *Pores* scanty, fine, joined by concentric lines of light tissue which sometimes anastomose. *Med. rays* fine, thin, clear, not numerous. Hard, heavy and smooth. *Wt.*—60 lbs. per c.ft.

USES :—Timber too small to be of much economic use. Leaves are used to intoxicate fish. Tree likely to be useful in re-afforesting bare hills.

See—Fish Poisons.

MURRAYA KÖENIGI Spreng.

FAM.—Rutaceæ.

COM. NS. :—*E.* Curry-leaf tree; *H.* Harri, Gandhla, Katnim; *K.* Kuri-bevu; *M.* Kadhi-nimb, Kudia-nimb, Poospala.

CHAR. :—A small unarmed, evergreen tree, 4.5-6 m. high, girth. 45-6 m. *Bark* grey with shallow netted fissures. *L.*—about 3 cm. long; 11-21 foliolate, pubescent or glabrous. Petiole slender, round, pubescent, not winged. Leaflets 2.6-4 cm., shortly petioluled, alternate, ovate-lanceolate, obtusely acuminate, slightly emarginate, usually oblique at the base, crenulate. *Fl.*—white, fragrant, small, ebracteate, in dense terminal corymbiform panicles. Sepals 5, acute, persistent. Petals 5, oblong-lanceolate, acute or obtuse, about 2.4 lin. long, dotted. Stamens 10, alternately longer. Filaments dilated below, and inserted around the elongated disc. Anthers small. Ovary 2-celled. Style short, thick; stigma capitate. *Fr.*—berry, ovoid or sub-globose, size of a small pea. 1-2 seeded, bluish-black, rugose. Seeds imbedded in mucilage. *Fl. t.*—hot season. *Fr. t.*—June onwards.

DISTR. :—Common in the moist evergreen forests of the Konkan and N. Kanara; forms a large proportion of the undergrowth in some of the high timber deciduous forests of the Supa sub-division in N. Kanara. Found wild at Mahabaleshwar and Matheran. Malabar, Travancore, Madras, Bengal, foot of the Himalayas from Garhwal to Sikkim. Pegu, Ceylon. Often cultivated.

DESCR. OF WOOD :—*Colour* greyish white. *Pores* small, sometimes sub-divided or arranged in patches of light tissue in a somewhat zig-zag concentric pattern; pores in some lines almost continuous. *Med. rays* fine, very numerous, concentric, white; lines less strongly marked than in *M. exotica*. Hard heavy and durable. *Wt.*—about 50 lbs. per c.ft.

USES :—Wood used for agricultural implements. Leaves used as condiment to flavour curries. Leaves, bark and root used medicinally.

See—Condiments and Spices.

MURRAYA PANICULATA Jack.

(MURRAYA EXOTICA Linn.)

FAM.—Rutaceæ.

COM. NS. :—*E.* Satin-wood ; *H.* Atal, Juti, Machula ; *K.* Angarakanagida, Karubevan-soppu ; *M.* Chaljuti, Kunti, Marchulajuti.

CHAR. :—An elegant tree, sometimes 4·5-7·5 m. high, girth about 45·6 m ; glabrous, unarmed, young parts pubescent. *Bark* thin, grey. *L.*—imparipinnate, 10·4-13 cm. long, glabrous, 3-9 foliolate. Leaflets obliquely-ovate or obovate, obtuse, often notched at the end, smooth, shining, deep-green above, shortly-petioluled. *Fl.*—campanulate, pure white, exquisitely fragrant, about 1·34 cm. diam., in terminal and axillary corymbs. Sepals 5, glandular, erect, acute. Petals 5, lanceolate, imbricate. Stamens 10, free, alternately shorter. Filaments subulate, inserted around a fleshy disc. Ovary oblong, 2-celled. Style thick as long as the stamens ; stigma capitate, glandular. *Fr.*—berry, red, long, acuminate, globose or ovoid ; 1-2-seeded. Seeds oblong, flat on one side, villous. *Fl. t.*—throughout the year, but in greater profusion in May-Sept. *Fr. t.*—Oct. Feb.

DISTR. :—Cultivated in gardens in the State. Found wild in outer Himalayas from the Jumna to Assam ; Bihar and W. India ; Burma, Ceylon, Andamans, China, Australia and the Pacific Islands.

DESCR. OF WOOD :—*Colour* light-yellow. Close-grained. *Pores* very small, sometimes in short radial lines of 2 or 3. *Med. rays* very fine, very numerous ; sharp white, concentric lines, which frequently run into each other, unevenly spaced, roughly about 40-50 per inch. Very hard, apt to crack in seasoning. *Wt.*—62 lbs. per c.ft.

USES :—Wood used for cabinet-work, tool-handles, walking-sticks. A possible substitute for boxwood for engraving work. Bark used as cosmetic by Burmese ladies.

N.B.—Three varieties are given in the *F. B. I.* *Var. 1*—a shrub with many flowered corymbs usually cultivated in gardens in the Bombay State, common in N. India. *Var. 2*—Arboreous with few-flowered corymbs is the W. Peninsula form ; evergreen in some N. Kanara rain-forests. Both these varieties have 2-celled ovary. *Var. 3*—ovary 4-5 celled—Ceylon.

MYRISTICA BEDDOMII King.

FAM.—Myristicaceæ.

COM. NS. :—*K.* Jajikai ; *M.* Jayphal.

CHAR. :—A tall evergreen tree. *Bark* smooth ; inner bark red, juicy. *L.*—coriaceous, 15-25 × 6·3 cm. ; oblong or elliptic-lanceolate,

acute, shining above, base rounded or suddenly cuneate. *Male fl.*—in pedunculate, woody, 8-20-flowered axillary cymes. Perianth ovoid, rufous-hairy outside, teeth 3, broadly triangular; staminal column shorter than the perianth. *Female fl.*—sessile, in axillary, few-flowered cymes. Perianth globular-urceolate, expanded below the spreading ovate teeth. *Fr.*—5.6 cm. in diameter, solitary or in pairs, sub-globose, apiculate, grooved on one side along the suture. Seed globose, smooth; aril red, fleshy. *Fl. t.*—Dec.-Feb. (Cooke). Nov.-Dec. (Talbot). *Fr. t.*—June-July (Talbot).

DISTR. :—Very common in the evergreen forests of the southern ghats of N. Kanara; also on the Konkan ghats. Western Peninsula up to Cape Comorin. Fairly common in the western slopes of the Nilgiris; Ceylon.

DESCR. OF WOOD :—*Colour* light-reddish-brown, with prominent regular concentric lines like *an. rings*. *Pores* moderate-sized, usually sub-divided radially into 2 or 3 or in short strings in echelon, rather scanty. *Med. rays* fine, numerous, irregular. Moderately hard, smooth, compact. *Wt.*—52 lbs. per c.ft.

USES :—Wood is used for tea-boxes in Ceylon.

MYRISTICA MAGNIFICA Bed.

FAM.—Myristicaceæ.

COM. NS. :—K. Raman-adike.

CHAR. :—A large evergreen tree, 27-30 m. high. Trunk when young furnished with large aerial roots, which start from the trunk 3 or 6 m. from the ground and are about 1.3 cm. thick at the ends, afterwards developing into buttresses. *Bark* smooth, dark-reddish-brown filled with much red juice. *L.*—coriaceous 30-60 × 9-20 cm., elliptic-lanceolate, acute or acuminate, shining above, silvery beneath, base rounded; petiole stout, channelled. *Male fl.*—in dense 8-15-flowered clusters from very short woody axillary tubercles. Perianth ovoid-globose, silky hairy outside; teeth 3 or 4, sharp; staminal column much shorter than the perianth. *Female fl.*—unknown. *Fr.*—7.5-10 × 5 cm., solitary or in pairs, axillary, ovoid, rufous hairy. Seed 5 × 2.5 cm., ellipsoid, striate, arillus deeply cleft into a few broad divisions.

DISTR. :—North Kanara near Malemani on the Gairsappa ghat in the evergreen forests. South Travancore in the plains.

DESCR. OF WOOD :—*Colour* light reddish-brown, streaked with many prominent brown concentric lines like *an. rings*. *Pores* moderate-sized, in short radial strings of 2 or 3. *Med. rays* very numerous, fine, brown. Soft. *Wt.*—30 lbs. per c.ft.

USES :—Not available.

MYRISTICA MALABARICA Lamk.

FAM.—Myristicaceæ.

COM. NS. :—E. False Nutmeg; K. Kanagi, Rampatri; M. Jangali or Ran Jaiphal, Kaiphal.

CHAR. :—A large, elegant, evergreen tree. *Bark* smooth, with small lenticular spots; the inner bark with much red juice. *L.*—10-20 × 4-6.8 cm., narrow, oblong or elliptic, lanceolate, acute or obtuse at the apex, acute or rounded at the base, glabrous on both sides, dull-coloured above, dull-brown or whitish beneath, petiole channelled above. *Male fl.*—more numerous and smaller than female ones on axillary cymes, 2.5-7.5 cm., perianth sub-globose, 3-4-cleft at the apex. *Anthers* 10-15, covering more than three-fourths of the column. *Female* peduncles axillary, usually simple, bearing 3-6 flowers. *Fr.*—6.8-7.5 × 1.3-2.6 cm. oblong. Aril orange-red, lobes twisted and folded into a cone at the top. *Fl. t.*—Nov.-Mar. *Fr. t.*—cold and hot season. Fruit remaining for a long time on the tree.

DISTR. :—In the evergreen forests of the Konkan and the N. Kanara ghats. Common in the Mukta taluka forests, Malabar.

DESCR. OF WOOD :—*Colour* reddish-grey. Close-grained. *An. rings* doubtful, reddish, distant concentric lines like rings conspicuous. *Pores* moderate-sized, oval, usually sub-divided, arranged in short radial strings in echelon, not numerous, uniformly distributed. *Med. rays* fine, not prominent. Moderately hard; liable to attacks from insects; not durable. *Wt.*—38 lbs. per c.ft.

USES :—Wood is said to be used for buildings, but not much. Seeds give an oil used for burning and for an ointment. It gives a kind of gum kino. Both the yellowish mace and the nutmegs are used as aromatic spices and are adulterated with true nutmeg.

See—Condiments and, Spices, Oils, Gums and Resins.

NAUCLEA MISSIONIS Wall.

FAM.—Rubiaceæ.

COM. NS. :—*M. Phuga*.

CHAR. :—A small-tree. *L.*—10-19 × 4-6.5 cm., almost sessile, glabrous, oblong or elliptic-lanceolate, acute or obtuse, membranous or coriaceous, glabrous, shining above; stipules arranged in a cylindric sheath, more or less connate below, persistent. *Fl.*—small, yellowish white, on axillary and terminal stout, short peduncles, each bearing a globose head, 2.5 cm. diam., four unequal bracteoles united into a cup above the base. Calyx and corolla tomentose. Stigma long, exserted, cylindric. *Fl. t.*—Apr.-May. *Fr. t.*—rainy season.

DISTR. :—Along rivers and water-courses in Konkan and N. Kanara (common near Yellapur); Travancore, Malabar.

DESCR. OF WOOD :—*Colour* yellow. *Pores* small to moderate-sized, often sub-divided into 2 or 3 partitions. *Med. rays* fine, numerous, bent where they touch the pores. Soft to moderately hard, *Wt.*—about 34 lbs. per c.ft.

USES :—Said to be valuable for furniture.

NAUCLEA PURPUREA Roxb.

FAM.—Rubiaceæ.

COM. NS. :—K. Ahnan ; M. Biloor, Phuga.

CHAR. :—A small glabrous tree. *Bark* grey, exfoliating in small scales ; inner bark yellow, fibrous, rapidly turning black on exposure to air. *L.*—10-23 × 4-13 cm., membranous, elliptic or elliptic-lanceolate, sub-acute, narrowed at the base, entire, smooth, and shining on both sides. *Fl.*—purple in globose heads, 4 cm. diam., on terminal peduncles about 5-7.5 cm. long. Stigma capitate. Ovary 2-celled ; capsule of two dehiscent cocci opening from the base. Seeds minute, numerous. *Fl. t.*—Feb.-Apr. Fruit remains on the tree for months.

DISTR. :—Rare in the State. On the Supa ghats of N. Kanara along streams and water courses ; Western Peninsula from the Konkan southwards.

DESCR. OF WOOD :—*Colour* light-red. Even-grained. *Pores* small, evenly distributed. *Med. rays* small, numerous, regular, smooth, moderately hard. *Wt.*—46 lbs. per c.ft.

USES :—Would make a handsome furniture timber.

NEPHELIUM LITCHI Camb.

FAM.—Sapindaceæ.

COM. NS. :—E. Litchi ; H. Litchi.

CHAR. :—An ornamental evergreen tree, 9-12 m. high, girth 9-1.2 m. *Bark* thin, grey, rough. *L.*—8-12, 24 cm. long, usually abruptly pinnate ; leaflets 2-8, 4-16 × 1.3-4.6 cm., opposite or alternate, oblong-lanceolate or ovate, acuminate, entire, coriaceous, glabrous, glossy above, glaucous, glabrous or glabrescent beneath, on short petiolules. *Fl.*—greenish-white, shortly pedicelled, small, arranged in tawny tomentose terminal panicles as long as or longer than the leaves. Calyx 4-(rarely) 5-lobed, puberulous on both sides. Petals none. Stamens 6-8 ; filaments hairy. Disc glabrous, crenulate, fleshy. Ovary 2-3 celled, covered with ferruginous tomentum. Style generally with 2 stigmatic lobes, sometimes with 3. *Fr.*—1-2-lobed, globose, size of a pigeon's egg, red, tubercled. Aril whitish, fleshy, sub-acid. *Fl. t.*—Feb.-Mar. *Fr. t.*—May.

DISTR. :—Occasionally cultivated near Bombay, cultivated largely in Northern India and in tropical and sub-tropical countries on account of its delicious fruits.

DESCR. OF WOOD :—*Colour* red. *Pores* moderate-sized, the transverse diameter usually greater than the distance between the rays. *Med. rays* very fine, very numerous. Wavy bands not so prominent as in *N. Longana*. Hard, heavy. *Wt.*—53-60 lbs. per. c.ft.

USES :—Fruit very delicious and edible.

See—Fruit Trees.

NEPHELIUM LONGANA Camb.

FAM.—Sapindaceæ.

COM. NS. :—*E. Longan* ; *K. Kanakindali* ; *M. Wumb.*

CHAR. :—A beautiful large evergreen tree, 9-15 m. high, girth 1·2-1·5 m. *Bark* smooth, yellowish grey, scaly. *Glabrous*. *L.*—10-47 cm. long. *Leaflets* 4-10, 5·30 × 1·3-6·5 cm., opposite or alternate, elliptic-oblong or ovate-lanceolate, obtuse or acute at the apex, and sometimes oblique at the base, entire, coriaceous, glabrous above, more or less glaucous beneath on small petiolules ; veins prominent. *Fl.*—pale, yellowish-white, small, on short pedicels arranged in terminal and axillary, pubescent panicles. *Calyx* deeply 5 (rarely) 6-partite, softly downy on both sides. *Petals* 5, rarely 6, pubescent, spathulate. *Stamens* 6-10, filaments tomentose. *Ovary* 2-3 lobed, tomentose. *Style* with 2-3-stigmatic lobes. *Fr.*—lobes, usually solitary, rarely 2-3, reddish or purple, globose, 1·3-2 cm. diam., tubercled. *Fl. t.*—Feb.-Mar. *Fr. t.*—rainy season.

DISTR. :—Mahabaleshwar, common in all the forests of the Western ghats in the evergreen forests of the Konkan and N. Kanara ; Western Peninsula ; Malabar ; Burma, Pegu, Ceylon. Often cultivated in tropical countries.

DESCR. OF WOOD :—*Colour* red. *Pores* small, numerous, uniformly distributed, the transverse diameter equal to the distance between the fine and very fine. *Med. rays* prominent ; wavy bands broader than the rays divide the wood into a succession of concentric strata. Moderately hard, rather heavy, durable, takes a fine polish. *Wt.*—about 59 lbs. per c.ft.

USES :—Wood good for furniture. Fruit is edible.

N.B.—Leaves of the "Longan" suffer greatly from damage done by Limacodid moth (*Parasa lepida*), which eats the leaves, sometimes completely defoliating the tree (Gamble).

See—Fruit Trees.

NOTHOPEGIA COLEBROOKIANA Blume.

FAM.—Anacardiaceæ.

COM. NS. :—*K. Ambatti*, *Mattigar*, *Ulagera* ; *M. Amberi*, *Sonemau*.

CHAR. :—A moderate-sized tree with milky acrid juice about 4-5 m. high. Branches glabrous. *Bark* thin, brown, rather shining, cracked in irregular flakes. *L.*—5·20 × 2·5-6·3 cm., alternate, elliptic-oblong, or oblong-lanceolate, acuminate, usually wavy, entire, coriaceous, glabrous, shining above and glaucous beneath ; nerves 15-20 pairs, arched, not prominent ; petiole naked. Racemes axillary or from the axils of fallen leaves, much shorter than the leaves, solitary and fascicled ; male much longer and more branched than the female. *Fl.*—small, numerous, white. *Sepals* almost orbicular. *Petals* linear-oblong, with recurved tips, hairy on the back. *Stamens* 4. *Ovary* ovoid, 1-celled. *Style* undivided ; stigma simple. *Fr.*—drupe, transversely oblong, depressed, red when ripe.

Seed 1, covered with sweet pulp. *Fl. t.*—Jan.-Mar. *Fr. t.*—Mar.-May.

DISTR. :—Common in the evergreen forests of the Konkan and N. Kanara ghats. Southwards to the Nilagiris and Travancore upto 1,500 m. Moist regions of Ceylon.

DESCR. OF WOOD :—*Colour* pinkish-yellow with a satiny lustre. *Close-grained*. *Pores* small, scanty, evenly distributed, joined by narrow, wavy, pale, concentric lines. *Med. rays* fine, pale, numerous. *An. rings* marked by concentric fine white continuous lines of white tissue. Strong, hard, compact, smooth. *Wt.*—47-62 lbs. per c.ft.

USES :—Not used. An excellent little-known strong wood which merits attention (Talbot). Fruit is like a plum; edible.

See—Fruit Trees.

NYCTANTHES ARBOR-TRISTIS Linn.

FAM.—Oleaceæ.

COM. NS. :—*E. Coral* or night-flowering jasmine, Indian Mourner; *G. Jayaparvati*; *H. Har*, *Har-singhar*, *Sooli*; *K. Harsing*, *Parijat*; *M. Parijataka*, *Prajakta*.

CHAR. :—A large shrub or a small tree rough all over with stiff hairs. Young branches 4-angled. *Bark* light-brown, rough. *L.*—opposite 5-10 × 2.5-6.3 cm. ovate, oblong-ovate, acuminate, entire. *Fl.*—white with a deep orange tube, fragrant, sessile; open in the evening and fall early in the morning, each supported by 2 bracts. *Fr.*—capsule, obovate, truncate or notched, about 4 cm. long, glabrous. *Fl. t.*—more or less throughout the year; abundant July-Sept.

DISTR. :—Found wild in the Satpuda forests of Khandesh, outer Himalayan ranges from the Chenab to Nepal, Assam, Madhya Bharat, Bengal and southwards to the Godavari; widely cultivated in gardens all over the State and in many parts of India: Burma.

DESCR. OF WOOD :—*Colour* pale red or pale yellowish-brown. *Close-grained*. *Pores* small, grouped in short radial lines, but arranged more or less in concentric rings. *An. rings* apparently marked by a dark line and a more complete ring of pores. *Med. rays* very fine to fine, very numerous, the distance between them equal to the transverse diameter of the pores. Transverse bars very numerous, faint, irregular. Moderately hard. *Wt.*—about 55 lbs. per c.ft.

USES :—Wood used as fuel, which is excellent. Rough leaves are used for polishing. The yellow corolla tubes give an orange-dye used for colouring silk. Root, leaves, flowers and seeds used medicinally.

N.B.—In the reclothing of bare hills, this tree is probably destined to play a considerable part. It is not usually eaten by goats; it densely covers the ground and helps to form humus.

See—Medicinal Plants, Dyes and Tans.

OCHNA SQUARROSA Linn.

FAM.—Ochnaceæ.

COM. NS. :—K. Kudeh, Narole ; M. Kanak-champa.

CHAR. :—A handsome glabrous shrub or a small tree. *Bark* brown, thin, smooth. *L.*—15·6-18·2 × 5·2 cm., oblong-ovate or obovate or elliptic-oblong, obtuse or pointed at both ends, slightly serrated, shining ; petiole short. *Fl.*—yellow, numerous, on short axillary racemes or from the branches below the leaves. Sepals 5, persistent, oval-obtuse. Petals 5-12, clawed, deciduous. Disc large, lobed. Stamens numerous, filaments short, filiform, anthers very long, linear. Ovary deeply lobed, many-celled. *Fr.*—of several carpels placed round the base of the style. *Fl. t.*—Feb.-Apr. *Fr. t.*—May-June. Leafless in cold season ; new foliage Feb.-Mar.

DISTR. :—Common in the moist forests of the Konkan and N. Kanara on the hills. Madras State, Burma, Ceylon. Also cultivated on account of its flowers.

DESCR. OF WOOD :—*Colour* reddish brown. Close-grained. Pores very small, numerous, regular, in the spaces between the moderately broad but not prominent *Med rays* which give a pretty silver-grain. Moderately hard ; warps badly if careful seasoning is not done. *Wt.*—50-58 lbs. per c.ft.

USES :—Wood, if carefully seasoned, is worthy of attention for inlaying and carving. Used for walking-sticks.

OCHROCARPUS LONGIFOLIUS Bth. & Hook. f.

FAM.—Guttiferae.

COM. NS. :—K. Gardundi, Surangi, Punay, Wundi ; M. Surangi.

CHAR. :—A large evergreen tree, 12-18 cm. high, with a girth of 1·8 m. *Bark* reddish brown, ·67 cm. thick, scaly, often covered with black patches, exuding a red gum. Glabrous ; young shoots terete, youngest slightly 4-sided. *L.*—15·6-20·8 × 3·7-8·13 cm., opposite or ternately verticillate, oval-oblong, linear-oblong, or oblong-lanceolate, obtuse at the apex, slightly attenuated or rounded at the base, hard, thickly coriaceous, dark-green, midrib prominent but the venation inconspicuous ; petiole stout. *Fl.*—polygamous, white streaked with orange-red, fragrant, 1·7 cm. diam., numerous on slender pedicels, arising from tubercles in the axils of fallen leaves ; buds globose. Calyx rupturing into 2 valves, reflexed during flowering. Petals 4, acute, deciduous. Stamens numerous. Ovary 2-celled ; style short, thick, subulate ; stigma large, peltate. *Fr.*—2·6 cm. long, obliquely-oblong, crowned by the hard style, 1-seeded. *Fl. t.*—Mar.-Apr. *Fr. t.*—cold season. The tree is polygamous in wild state, but often becomes hermaphrodite when cultivated.

DISTR. :—Ghats of Konkan, very common in Ratnagiri, Matheran, Kanara ; Malabar. Cultivated in Orissa, Northern Circars and elsewhere.

DESCR. OF WOOD :—*Colour* red. Close and even-grained. *Pores* moderate-sized. *Med. rays* moderately broad, very numerous, the distance between them equal to or less than the diameter of the pores. *An. rings* marked by the dark lines. Lines of soft-texture numerous, but indistinct. Numerous resin ducts in radial long cells, which appear as shining lines on a horizontal section and as black points on a vertical section. Hard, smooth. *Wt.*—about 60 lbs. per c.ft.

USES :—Wood used for house-building. The flower used to dye silk.

See—Dyes and Tans.

OLEA DIOICA Roxb.

FAM.—Oleaceæ.

COM. NS. :—*E.* Indian Olive, Rose Sandal-wood tree; *K.* Akki, Burra-nuge, Hejje-akerkal, Mudla; *M.* Edana, Karamba, Lauki, Par-jamb.

CHAR. :—A small or moderate-sized glabrous, dioecious tree. *Bark* 1·3 cm. thick, grey, smooth outside, yellow and fibrous within. *L.*—7·5-13 × 5·6-3 cm., oblong-elliptic, lanceolate-acuminate, remotely and rather acutely serrate, coriaceous, narrowed at the base; petiole 3-4 lin. long. *Fl.*—small, greenish-white (female somewhat larger) arranged in short paniced racemes arising from the axils of the leaves opposite to them or below. *Fr.*—drupe, size of a pea, purplish, globose, with a one-seeded nut. *Fl. t.*—Jan.-Apr. *Fr. t.*—May-June.

DISTR. :—Very common all along the ghats. Very common at Matheran, Khandala, Lonavala, Mahabaleshwar, Castle-rock. Evergreen ghat forests of N. Kanara; Western Peninsula; lower hills of Assam and Bengal.

DESCR. OF WOOD :—*Colour* light reddish-brown. Sap-wood reddish-grey; heart-wood of old trees dark-yellowish brown, streaked and mottled. *Pores* moderate-sized, enclosed in rings of pale tissue and arranged in radial somewhat oblique strings. *Med. rays* very fine, numerous, wavy, crossed by concentric wavy lines of light coloured tissue at unequal distances. Hard, rather rough, strong. Sweet scented when freshly cut (hence called in N. Kanara Pun-neerigund or rose sandal-wood). *Wt.*—54 lbs. per c.ft. Sap-wood weight nearly as much as the heart-wood.

USES :—Wood used for carving and cabinet-work.

OROXylum INDICUM Benth.

FAM.—Bignoniaceæ.

COM. NS. :—*E.* Indian Trumpet Flower; *G.* Podval, Tetu; *H.* Arlu, Phârri, Ullu; *K.* Alangi, Bagi, Mokka, Tetu; *M.* Tetu.

CHAR. :—A small deciduous tree, 7·5-12 m. high; girth 6-1·5 m. *Bark* light brownish-grey, soft, yields a green juice when cut. *L.*—1·2-1·5 m. long; pinnae 3-4-pairs, the lowest pair bipinnate; leaflets 7·5-20 cm. long, broad-ovate, acuminate, petioled, sub-cordate, entire.

Fl.—Large, fetid, dark-red, fleshy, on short pedicels in erect terminal racemes. Calyx about 2.5 cm. long. Corolla 5.7.5 cm. diam. *Fr.*—capsule, 6.1.2 m. \times 7.5-10 cm., flat. Seeds 4 cm. wide, with a large pellucid wing all round. The pod resembles a scabbard. *Fl. t.*—rainy season. *Fr. t.*—cold season. Leafless Feb.-Mar; new foliage Apr.-May.

DISTR. :—Throughout the Konkan and the N. Kanara ghats in moist forests, very common in the rain-forests near Nilkund. Throughout India except in the western drier areas; Ceylon, Malaya, Indo-China (Viet Nam), Burma.

DESCR. OF WOOD :—*Colour* yellowish-white. Coarse-grained. No heart-wood. *Pores* scanty, moderate-sized, uniformly distributed. *An. rings* marked by more numerous pores. *Med. rays* fine to moderately broad, prominent on a radial section. Soft. *Wt.*—30 lbs. per c.ft.

USES :—An inferior timber, little used, for anything except for temporary huts; reported to be used in Chittagong for beams, plankings and scantlings. Root-bark and fruits are used medicinally. They are also used in tanning and dyeing.

See—Medicinal Plants, Dyes and Tans.

OUGEINIA DALBERGIOIDES Benth.

FAM.—Papilionaceae.

COM. NS. :—*H.* Sandan, Tinnas, Timsa; *K.* Betta honne, Kari mutal; *M.* Kala palas, Tiwas; *Tr.* Sandan.

CHAR. :—A moderate-sized deciduous tree, 6-12 m. high, girth 9.2.1 m.; trunk short, erect. *Bark* light brown, sometimes with bluish patches, with regular longitudinal and horizontal cracks. Branches terete, slender. *L.*—about 31 cm. long, ternate, alternate, stipulate, petioled. Leaflets coriaceous, glabrous or pubescent below, wavy; terminal leaflet 7.5-15 \times 5-7.5 cm., roundish or obovate; lateral, 10 \times 7.5 cm. opposite, oblique-oval, obtuse, entire or crenate. *Fl.*—numerous, white or pale-rose, fragrant, on slender pedicels forming short, fascicled racemes. Calyx sub-bilabiate. *Fr.*—pod, 5-7.5 cm., linear-oblong, obtuse, contracted between the seeds. Seeds 2.5. *Fl. t.*—Mar.- May. *Fr. t.*—June.

DISTR. :—Throughout the State in deciduous forests; fairly common in the forests of Yellapur (N. Kanara), northern and central India, Lower Himalayas from the Jhelum to Bhutan upto 1,500 m.; Behar, Chota Nagpur, Orissa, and the Circars down to the Godavari; Occasional in Mysore and the Nilgiris.

DESCR. OF WOOD :—*Colour* sap-wood small, grey; heart-wood mottled, light brown, sometimes reddish brown. Close-grained. *An. rings* indistinct. *Pores* moderate-sized, enclosed in irregularly shaped more or less concentric but interrupted patches and bands of white soft tissue. *Med. rays* fine, numerous, white, uniform and equidistant, distinctly visible in the hard tissue between the soft patches. *Pores* marked on a longitudinal section, which also is characterized by very regular faint crossbars. No taste or

smell; a heavyish wood with bands of interlocked fibres; large logs usually have unsound centres; air-seasons slowly; kiln-seasons without difficulty; hard; stands shearing stresses to a remarkable degree; durability fairly high. *Wt.*—55 lbs. per c.ft.

USES :—Wood used for buildings, carts, carriages and their parts, furniture, agricultural implements; well-construction, palanquin-poles, tent-pags, boat-building, tool-handles; one of the best woods hitherto tried for cooper's work, carving and turning. Pounded bark used to intoxicate fish; bark gives rough coarse fibre and a red astringent, transparent gum from incisions. Branches are lopped off for cattle fodder.

See—Fish *Poisons, Fibres, Gums and Resins, Fodder Plants.

OURATEA ANGUSTIFOLIA Gilg.

FAM.—Ochnaceæ.

COM. NS. :—K. Valermiani.

CHAR. :—An evergreen glabrous tree, 9 m. high in favourable places. *L.*—about 13 × 4 cm. ovate-oblong, or elliptic-oblong, acute or acuminate at both ends, slightly serrated, coriaceous, glabrous, shining and dark-green above, and of a lighter colour below, sessile; midrib prominent. *Fl.*—yellow, inodorous, on slender pedicels, arranged in terminal racemose panicles. Sepals 5, broad-ovate, coriaceous, shorter than petals. Petals 5, deciduous. Stamens 10, filaments very short, Carpels 5, obovate, or reniform. *Styles* connate, longer than the stamens; stigma quite entire. *Fr.*—drupe, size of a pea, red and shining, reticulated, surrounded by the red calyx. *Fl. t.* and *Fr. t.*—greater part of the year.

DISTR. :—On the ghats of S. Konkan (Nimmo ex Graham); S. India, Singapore, Ceylon, Philippines.

DESCR. OF WOOD :—*Colour* reddish-brown. Close and even-grained. *Pores* very small, very numerous, regularly distributed. *Med. rays* fine to moderately broad, very numerous, regular. Hard, cuts easily.

USES :—Wood used for building purposes. Root and leaves said to be used medicinally in Malabar.

OXYTENANTHERA STOCKSII Munro.

FAM.—Gramineæ.

COM. NS. :—K. Konda, Oor-scheme; M. Chivari, Mes.

CHAR. :—A tall bamboo; stems 9 in. high and 2.5-4 cm. in diameter, grey-green, covered, when young, with a white or grey deciduous tomentum; nodes with softly hairy ring; internodes 15-30 cm. long; stem sheaths 15-23.5 cm. long by 7.5-17.5 cm. wide at the base, tapering upwards, appressedly brown-hairy on the back, ciliate on margins. *L.*—10-20 × .9-1.8 cm., rounded or attenuate at the base; top ending in setaceous point, glabrous above, glabrous or hairy beneath. Panicles large, of spicate heads reaching 2.5 cm. in diameter, with many closely packed spinous spikelets. The heads supported by rounded chaffy bracts. *Fl. t.*—November.

DISTR. :—Konkan and N. Kanara, commonly cultivated along the coast ; rare in the ghat forests of N. Kanara. Panchgani (planted). Western Peninsula.

DESCR. OF WOOD :—A slender, stout, strong bamboo with a small cavity.

USES :—Used for construction, umbrellas, baskets, makes excellent punting poles. A very useful species in the coast villages.

PAJANELIA MULTIJUGA DC.

FAM.—Bignoniaceæ.

COM. NS. :—K. Aminge ; M. Daundi.

CHAR. :—A large glabrous, usually deciduous tree, 9-18 m. high. *Bark* dark-grey, rough. *L.*—imparipinnate, 45-9 m. long, rachis angular ; leaflets 9-12 pairs and an odd one. 10-20 × 4-7.5 cm., ovate or elliptic, acute, very unequal-sided at the base. *Fl.*—in large robust, erect panicles 30-45 cm. long, corolla with dull purple tube and yellow lobes 6.3-10 cm. long ; pubescent outside in the upper part ; tube narrow below, swollen above ; lobes rounded and incised at the apex. *Fr.*—capsule, 30-50 × 6.3-8.8 cm., straight, compressed, 2-winged on each margin, oblong, pointed. Seeds compressed, winged at two ends and with a small wing on one or both of the long sides. *Fl. t.*—cold season. *Fr. t.*—hot season. A tree with ornamental large flowers.

DISTR. :—In the moist forests of N. Kanara, along the banks of the nalas in the Yellapur taluka. Silhet, Khasia hills, Malabar : Pegu, Tenasserim and the Andamans.

DESCR. OF WOOD :—*Colour* orange-brown. Close-grained. *Pores* large, occasionally filled with yellow resin ; each pore surrounded by a narrow ring of soft tissue, uniformly distributed. *Med. rays* fine, very numerous, uniform and nearly equidistant, prominent. Soft, light. *Wt.*—30 lbs. per c.ft.

USES :—Timber not used in Kanara. The wood is excellent and deserves to be better known ; it is used in the Andamans, where the tree grows to a large size, for canoes (Gamble).

PALAEQUIM ELLIPTICUM Engl.

FAM.—Sapotaceæ.

COM. NS. :—E. Indian Guttapercha tree ; K. Ippa, Ippi, Panchoti ; M. Palla, Panchoti ; *Tr.* Pali.

CHAR. :—A very large tree, reaching 30 m. high, girth 3-6 m., trunk without branches for a considerable height. *Bark* rusty. *L.*—6.3-10 × 5 cm., crowded at the end of branchlets, coriaceous, entire, abruptly acuminate, narrowed at the base, dark-green above, pale beneath ; nerves prominent beneath. *Fl.*—fascicled, axillary, pedicellate. Calyx 6-divided, divisions in two series. Corolla 5-6-cleft, contorted in æstivation, deciduous. Stamens 12-18. *Fr.*—berry, oblong, smooth, size of a large almond, 1-2-seeded. *Fl. t.*—Feb.

DESCR. OF WOOD :—*Colour* reddish-brown ; fairly large sap-wood of lighter colour. Straight-grained ; even-textured ; with a slight rubber-like odour when freshly cut. *Pores* moderate-sized to large, in oblique or echeloned strings. *Med. rays* fine, numerous, often 2 to 3 to each group of pores. Concentric bands of light tissue numerous, wavy. Moderately hard, strong ; seasons well ; cracks and end-splits in dry climate ; not very durable ; easy to saw and work to a fine surface ; takes good polish. *Wt.*—44 lbs. per c.ft.

DISTR. :—Very rare in the Bombay State ; in rain forest near Castle-rock, N. Kanara. Common in ghats, evergreen forests, Alt. 300-1,400 m.

USES :—Wood used for house-building, shingles, cooper's work. The wood was tried in Madras for rotary cut-veneers and plywood with success ; would probably be suitable for paving blocks. Tree yields a kind of gum, called "Indian Gutta-percha" which is of no value compared to the true article. It might, however, be used as "bird-lime" and for encasing telegraph wires.

See—Gums and Resins.

PHOENIX SYLVESTRIS Roxb.

FAM.—Palmae.

COM. NS. :—*E.* Date-sugar or Indian wine or wild date palm ; G. Kujuri, Kherk, Tadi ; *H.* Khaji, Khajuri, Salma, Sendhi, Thekil ; K. Ichalamara, Kall-challu, Kallu ; *M.* Boichandy, Shindi.

CHAR. :—A tall graceful palm, 9-15 m. high ; girth .9-1.5 m. Crown thick, hemispherical ; trunk clothed with persistent scars of fallen leaves or bases of petioles. *L.*—2.1-4.5 m. greyish-green, pinnate ; petiole short and dilated at the base ; pinnæ 15-45 cm. alternate, opposite, rigid. *Fl.*—small, sessile ; calyx and corolla 3-toothed or parted in both sexes ; stamens in male flowers 6, ovary rudimentary ; female flowers, carpels 3 ; male flowers in compact panicles, 15-30 cm. *Fr.*—oblong, reddish-yellow when ripe, about 2.5 cm. long, smooth, supported by the perianth. *Fl. t.*—Jan.-Feb. *Fr. t.*—May and rainy season.

DISTR. :—Moist situations in dry regions ; in fairly good quantity in Surat, Sholapur and Poona districts, usually along banks and in beds of streams and water-courses. Tolerably common throughout India, wild or more often cultivated ; Bengal, Bihar, Coromandel coast, Rohilkhand, Mysore, Siwalik, outer Himalayas, Mt. Abu.

DESCR. OF WOOD :—*Colour* lightbrown ; outer cylinder hard and rough, inner soft. Fibrovascular bundles large, the horny part pale shining, round or oval, with 3 to 5 pores at the inner border. Durable. *Wt.*—37 lbs. per c.ft.

USES :—Wood is used for buildings (occasionally), rafters, water pipes and turning. Leaves are made into mattings, ropes and baskets. Chiefly cultivated on account of its sweet sap (Nira), which is extracted during the cold season, by a deep notch cut into the trunk immediately below the lower leaves. Root (rarely), fruit and juice are used medicinally.

See—Medicinal Plants, Liquors, Fibres.

PISONIA MORINDIFOLIA R. Br.

FAM.—Nyctaginaceæ.

COM. NS. :—*E.* Lettuce Tree, Chinese lettuce; *M.* Chinai salit.

CHAR. :—A tall shrub or a small glabrous evergreen tree. 4.5-9 m. high; girth .9-1.2 m. *L.*—15-30 × 12.5 cm., oval or elliptic-oblong, acute or shortly acuminate, oblique and unequal at the base, membranous, entire or denticulate, lettuce-green, young ones almost white. The leaves of the male plant are of a darker green colour than those of the female. *Fl.*—yellowish-green, in terminal, rather large cymes. *Fr.*—on long slender pedicels; club-shaped, 1.3-2 cm. long with 5 single lines of protuberances.

DISTR. :—Cultivated in gardens in coast towns in India. Grown in bungalows in Bombay, Madras, Calcutta; Andamans (Beach forests), Malay Islands.

DESCR. OF WOOD :—Not available.

USES :—Wood seldom used.

PITHECOLOBIUM BIGEMINUM Mart.

FAM.—Mimosaceæ.

COM. NS. :—*H.* Kachlora; *K.* Kankaringe.

CHAR. :—A middle sized unarmed evergreen tree. *Bark* grey, smooth. Branchlets, inflorescence, and legume with thin, brown, ferruginous pubescence. *L.*—common petiole 2.5-7.5 cm., with an oval gland on it and at the base of each pinna and leaflet. Pinnæ 2-4; leaflets 4-6, sub-coriaceous, elliptic-oblong, or obovate-oblong, acute, the upper 10-15 cm., the lower shorter, the pinnæ distinctly petioled. *Fl.*—white, silky. Heads with 6-12-sub-sessile flowers in copious, large, axillary and terminal panicles. *Fr.*—pod, 7.5-15 × 1.3-2 cm., generally spirally twisted, slightly pubescent, valves coriaceous. *Fl. t.*—Jany.-Mar. *Fr. t.*—Aug.-Oct.

DISTR. :—Common in the evergreen forests of Konkan and N. Kanara, Eastern Himalayas, Western Peninsula: Ceylon, Malay Islands and Philippines.

DESCR. OF WOOD :—*Colour* brown. *Pores* few, medium-sized to large, often sub-divided, equally distributed, not enclosed in rings of white or pale tissue. *Med. rays* extremely fine, numerous and closely packed. Soft, light; not easy to work. *Wt.*—22-31 lbs. per c.ft.

USES :—Wood used for planking, battens, etc.

PITHECOLOBIUM DULCE, Benth.

FAM.—Mimosaceæ.

COM. NS. :—*E.* Manilla tamarind; *H.* Dakhani-babul, Vilayati Imli; *M.* Valayati Chinch.

CHAR. :—A moderately large ever-green tree, 6-9 m. high, girth 1.2-1.5 m., armed with short straight stipular thorns. *Bark* smooth, lenticellate, with horizontal raised ridges, often crowded with woody

prickles. *L.*—pinnæ and leaflets 2. Leaflets unequal-sided, 2-5.5 cm., oblique, obovate-oblong, rigidly sub-coriaceous, obtuse, glaucescent. *Fl.*—white, sessile, in small heads, 1.3 cm. broad, on long terminal, racemose panicles. Calyx a line long. *Fr.*—pod, 10-13 × 1.3 cm., fleshy, coriaceous, twisted. Seeds 6-8, dark-brown, imbedded in a white, firm, sweet, edible pulp. *Fl. t.*—Jan.-Mar. *Fr. t.*—ripe Apr.-June.

DISTR. :—A native of Mexico, introduced into India ; is cultivated often as a hedge plant ; is met with as hedge in the State in many places, specially in Bombay and Poona.

DESCR. OF WOOD :—*Colour* white with a light-red heart-wood. *Pores* moderate-sized, enclosed in broad patches of white soft tissue, in concentric bands, often anastomosing. *Med. rays* fine, very numerous, the distance between them less than the transverse diameter of the pores. Hard, not very durable, easy to work ; saws and finishes to a good surface ; takes a good polish. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for carts and ploughs ; is used as a fuel and is specially appreciated by the brick-maker. Leaves and twigs furnish forage for milch-goats.

See—Fodder Plants.

PITTOSPORUM DASYCAULON Miq.

FAM.—Pittosporaceæ.

COM. NS. :—K. Boogri ; M. Capsundi.

CHAR. :—A small tree ; young parts densely rusty-tomentose. *Bark* thin, lenticellate. *L.*—thin, coriaceous, lanceolate or broadly ovate, glabrous, or midrib downy beneath ; shining above, paler beneath, 5-12.5 × 2-6.3 cm. ; petiole channelled above. *Fl.*—white in short, dense, tomentose corymbs ; pedicels rufous hairy. Sepals acute, ovate, ciliate. Petals narrow, oblong, imbricate. Anthers bright yellow, ovary densely tomentose ; stigma capitate. *Fr.*—capsule, 2-valved, compressed, crowned with persistent style, densely grey tomentose when young ; valves woody, channelled down the middle, white inside. *Seeds* 4-6, black, smooth, irregularly obtuse-angled. *Fl. t.*—cold season. *Fr. t.*—Feb. to rainy season.

DISTR. :—Konkan, N. Kanara, Belgaum, common in the evergreen ghat jungles, Western Peninsula.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* fairly marked. *Pores* small, rather scanty and irregularly distributed. *Med. rays* fine, prominent, not numerous, pale, moderately hard.

USES :—The same as *P. floribundum*.

PITTOSPORUM FLORIBUNDUM W. & A.

FAM.—Pittosporaceæ.

COM. NS. :—H. Raini ; K. Tammata ; M. Yekadi, Vekhari, Vikhari.

CHAR. :—A small tree ; branches often umbelled. *Bark* very thin, light greenish-grey with very prominent horizontal lenticels.

Trunk short. *L.*—5.2-20.3 × 2.6-7.8 cm., elliptic or oblong-lanceolate, acute or acuminate, margins waved, thinly-coriaceous, glabrous, shining above, pale below. *Fl.*—numerous, dingy-yellow, small, pubescent, in terminal much-branched compact racemes or corymbs. Sepals obtuse or acute. Petals oblong, obtuse, patent, at last recurved. *Fr.*—capsule, glabrous, rugose, about 6-seeded, opening into 2, hard, broad-ovate valves. *Fl. t.*—Jan.-June. *Fr. t.*—Apr.-Sept.

DISTR. :—Mahabaleshwar and all along the Western ghats upto Nilagiris. Pretty common at Khandala mostly on dry and rocky sides; sub-Himalayan tract and lower Himalayas from the Jumna to Sikkim along rivers and in ravines, Khasia and Mishmi hills. Hills of S. Arcot and Salem; Burma.

DESCR. OF WOOD :—*Colour* white. Close-grained. *Pores* small, often sub-divided or in strings, scanty and unequally distributed. *Med. rays* fine to moderately broad. Strong, tough, moderately hard but of small size. *Wt.*—40 lbs. per c.ft.

USES :—Bark bitter and aromatic, used as a febrifuge. Tree deserves cultivation for ornament.

See—Medicinal Plants.

PLECOSPERMUM SPINOSUM Trec.

FAM.—Urticaceæ.

COM. NS. :—No common names.

CHAR. :—A large thorny shrub or a small tree; branchlets drooping, minutely pubescent; spines stout, axillary, straight. *Bark* thin, orange-coloured, peeling off in thin brittle flakes. *L.*—5.7.5 × 2.5.3.1 cm., obovate or elliptic, obtuse or acute, glabrous, base narrowed into a petiole. *Fl.*—dicecious, in axillary solitary or fascicled heads; male flowers—heads with fascicled peduncles; flowers distinct, minute, subsessile; female flowers—heads larger than male, flowers connate in the heads. *Fr.*—lobed, 1.3 cm. in diameter. *Fl. t.*—Jan.-Apr.; *Fr. t.*—Apr.-June.

DISTR. :—In the dry districts of the State; common in hedges in the Dharwar district. Also in N. Kanara at Banwasi, Sirsi Sub-division. From the Salt Range along the foot of the Himalayas and southwards to Ceylon.

DESCR. OF WOOD :—*Colour* greyish-white, with a small bright orange-yellow heart-wood which is very hard. *Pores* from small to large, joined by wavy, more or less concentric, bands of soft and interrupted tissue, which alternate with shining bands of firmer texture of about the same width. In the heart-wood the pores are filled with a yellow resinous substance. *Med. rays* fine and very fine, wavy. *Wt.*—50 lbs. per c.ft.

USES :—Wood used in the Darjeeling Terai to give a yellow dye.

See—Dyes and Tans.

PLUMERIA RUBRA FORMA ACUTIFOLIA Woodson.**(PLUMERIA ACUTIFOLIA Pois.)**

FAM.—Apocynaceæ.

COM. NS.:—*E. Frangipani*, Pagoda Tree, Temple Tree; *G. Radha-champo*; *H. Goleurchampa*, Golainchi; *K. Belchampaka*, Devagangale, Kadusampige; *M. Khairchapha*.

CHAR.:—A small glabrous tree with thick, blunt, crooked branches 4·5-7·5 m. high; girth 6·1-2 m. *Bark* thick with smooth outer layer, grey, shining, exfoliating in small flakes. *L.*—12·5-38 cm. obovate-lanceolate, shortly acuminate, entire, tapering on a 2·5-5 cm. petiole. *Fl.*—large, white, slightly pinkish outside, with pale-yellow throat, forming a large pedunculate cymose corymb. *Fr.*—Follicles linear, rigid, cylindrical, divaricate, about 15 cm. long. *Fl. t.*—practically throughout the year—abundant from Mar. to May. It rarely fruits.

DISTR.:—Cultivated and naturalised near temples and villages throughout the State and India. Native of Tropical America.

DESCR. OF WOOD:—*Colour* yellowish white. *Pores* small, in short radial groups, rather scanty. *Med. rays* fine, numerous. *Soft. Wt.*—37 lbs. per c.ft. (one specimen).

USES:—Wood good for native drums (Troup). Unsuccessful attempts have been made to manufacture caoutchouc from the abundant, tenacious milky juice flowing on wounding the bark or any other part of the tree. Root, bark, leaves and milky juice are used medicinally. Flowers are made into garlands.

See—Medicinal Plants, Gums and Resins.

POLYALTHIA CERASOIDES Benth & Hook. f.

FAM.—Anonaceæ.

COM. NS.:—*K. Vubbina*, San hesare; *M. Hum*.

CHAR.:—An evergreen tree, sometimes attains a great height. *Bark* rough, grey, 67 cm. thick. Young parts tomentose. *L.*—8-27 cm. × 2·5-5 cm., distichous, oblong-lanceolate, acuminate, dark-green, glabrous above, pubescent beneath. *Fl.*—Greenish white, about 1·3 cm. in diameter, peduncles woody, arising from axillary tubercles. Sepals ovate membranous. Petals ovate or linear oblong, thickly coriaceous, puberulous. Carpels numerous, size of a small cherry, dark-red, on slender stalks. *Fl. t.*—Feb.-May.

DISTR.:—Western ghats from Nasik southwards, throughout the Peninsula. Bihar, Chota Nagpur, Northern Circars, Burma. Usually found in dry forests, sometimes in damp forests.

DESCR. OF WOOD:—*Colour* olive-grey. Close-grained with numerous distinct bars, 100-120 per cm. *Pores* small, scanty. *Med. rays* moderately broad or broad, short, with a good silver grain. Moderately hard. *Wt.*—about 50 lbs. per c.ft.

USES:—Used in carpentry and for boat-building (masts and small spars).

POLYALTHIA FRAGRANS Benth & Hook. f.

FAM.—Anonaceæ.

COM. NS. :—K. Gauri.

CHAR. :—A large tree. Young branches hoary. *L.*—10·4-23·4 × 5·2-13 cm., membranous, oblong-lanceolate, acuminate, rounded at the base, generally oblique on petiole, very prominently veined especially beneath, glabrous above, slightly pubescent on the costa beneath. *Fl.*—fragrant, white or yellowish-white on peduncles about 2·6 cm. long, from the axils of fallen leaves or on woody tubercles, cymose, 5-12 flowered, puberulous; pedicels slender, hoary; bracts cup-shaped about the middle. Sepals small, rotundate. Petals 2·6-4 cm. long, narrow, attenuated at the apex. Carpels 10-20, 2·6-4 cm., broadly oblique-ovoid, hoary, on a stock 2·0-4 cm. long. *Fl. t.*—Nov.-Dec.

DISTR. :—Evergreen forests of the Western Ghats from Ratnagiri district southwards; South Kanara Ghats and Malabar.

DESCR OF WOOD :—*Colour* greyish-white. The cross-bars exceedingly numerous and regular. *Pores* rather small, very scanty. *Med. rays* moderately broad, unequal, giving a conspicuous silver grain. Moderately hard. Decays quickly on exposure. *Wt.*—40 lbs. per c.ft.

USES :—Used for masts.

POLYALTHIA LONGIFOLIA Benth.

FAM.—Anonaceæ.

COM. NS. :—E. Indian Fir, Mast tree; H. Asok, Decadari; K. Putrajivi; M. Ashok, Asuphala.

CHAR. :—A large evergreen tree; entirely glabrous; height up to 15 m. with a girth up to 1·8 m. *Bark* smooth, dark greyish brown. *L.*—13-20 cm. × 2·6-5·2 cm., narrow lanceolate, long acuminate, wavy, shining above, pellucid, dotted. *Fl.*—numerous, umbellate, yellowish-green on long slender pedicels. Sepals broad ovate. Petals equal, narrow linear from a broad base. Carpels ovoid, obtuse at both ends. *Fl. t.*—Feb.-May.

DISTR. :—Extensively planted in avenues along the roads in the State, and other parts of India. Indigenous in Ceylon.

DESCR. OF WOOD :—*Colour* white, yellowish-white or greyish-white. The cross bars extremely numerous, equidistant, rather faint. *Pores* small to moderate-sized, rather scanty, uniformly distributed. *Med. rays* short, fine to broad. It is light, tough, tolerably close and even-grained; easily bent. *Wt.*—37 lbs. per c.ft.

USES :—Used for making tubs, buckets, casks, drum-cylinders, etc.

PONGAMIA PINNATA Pierre.

(PONGAMIA GLABRA Vent.)

FAM.—Papilionaceæ.

COM. NS. :—Indian Beech; G. Kanaji, Karanji; H. Kanja Karang, Kirmal; K. Honge, Huligalli, Karanj-marū; M. Karanja.

CHAR. :—A tall almost evergreen tree, with short white or dark cinereous trunk, 15-18 m. high; girth 1.5-2.4 m. *Bark* soft, grey, covered with tubercles. *Leaflets* 5-7, opposite, oblong or ovate, acute, 5-12.5 cm. long. *Fl.*—mixed white, blue or purple, in peduncled axillary racemes; pedicels with a pair of bracteoles in the middle. *Calyx* nearly truncate. *Corolla* much exserted, 1.3 cm. in diam., standard broad, keel obtuse, petals united. *Fr.*—legume, thick, woody, 5 cm. long, 1-2, seeded. *Fl. t.*—May-June. *Fr. t.*—Apr. of the following year.

DISTR. :—Planted and wild. Throughout the State in moist situations along rivers and *nalas* (Deccan). Often planted as a roadside tree. Very common near the sea-coast (Konkan). From the Himalayas to Ceylon and Malacca.

DESCR. OF WOOD :—*Colour* white turning yellow on exposure. *An. rings* indistinct. *Pores* moderate-sized, scanty, included in and joined by white, wavy, concentric anastomosing bands of loose texture, which alternate with bands of darker colour and firmer texture. The bands are not quite continuous as they sometimes stop and sometimes anastomose. *Med. rays* fine, white, numerous and uniformly distributed, moderately hard, tough; not durable; readily eaten by insects but is improved by seasoning in water. *Wt.*—42 lbs. per c.ft.

USES :—Wood is used for buildings, oil-mills, cart-wheels and as fuel. Leaves used as fodder and more especially are ploughed into rice fields as manure. Seeds and seed-oil are used medicinally. Oil is also used for burning. Oil-cake is used as manure to keep off white-ants.

It is a fast growing and handsome tree good for avenues.

See—Medicinal Plants, Oils, Fodder Plants.

POUTERIA TOMENTOSA Buchn.

(SIDEROXYLON TOMENTOSUM Roxb.)

FAM.—Sapotaceæ.

COM. NS. :—*K.* Kumpoli, Gomale, Gwabale, Suna-hale; *M.* Kanta-kumla, Kumbul.

CHAR. :—A middle-sized evergreen tree, frequently armed with almost axillary spines. *Bark* light reddish-brown, thin, rough, much cracked. Young parts tawny-tomentose. *L.*—7.5-13 × 5 cm., oval, oblong, or obovate-oblong, short-petioled, glabrous above, more or less tawny-villous and often glabrescent beneath, a little waved. *Fl.*—rather small, dull-white, 5-merous, fascicled, axillary, nodding. *Calyx* rusty-pubescent. *Corolla* twice as long as the calyx; petaloid staminodes as long as the stamens, hairy, yellow. *Fr.*—ovate, size of an olive, yellow, 1 or 2-seeded by abortion. *Fl. t.*—Oct.-Jan.

A very variable species of which there are two distinct varieties, one with very tomentose foliage found in this State (Konkan, Deccan) and the other more glabrous, common in the Nilagiris and other S. Indian hills.

DISTR. :—Western Peninsula from the Konkan southwards. Common in the evergreen forests of the N. Kanara and Konkan ghats ; Ceylon, Burma.

DESCR. OF WOOD :—*Colour* light yellowish-brown. Loose-grained. *Pores* fine (hill specimen) to moderate-sized (plains specimen), in groups in short lines usually oblique, the groups somewhat far apart and in echelon. *Med. rays* very fine, very numerous, equidistant. Very numerous, very fine faint lines across the rays, irregular. Moderately hard (plains specimens), too hard (hill specimens), heavy. *Wt.*—56 lbs. per c.ft.

USES :—Wood used for beams of houses and good carpenters' planes. Fruit is eaten in curries and made into pickles.

See—Fruit Trees.

PREMNA INTEGRIFOLIA Linn.

FAM.—Verbenaceæ.

COM. NS. :—*G.* Arni ; *H.* Arai, Agotha, Ustabanda ; *K.* Agni-mandha, Bije, Ichu ; *M.* Aran, Chanari, Khara-narvel.

CHAR. :—A large shrub or a small tree, 9 m. high. *Bark* yellowish, lenticellate ; trunk and large branches sometimes thorny. *L.*—5.9 × 3.2-6.3 cm., broadly elliptic, entire or upper part dentate. *Fl.*—in paniculate corymbose cymes, small, greenish-yellow ; corolla tubular, cylindric, hairy in the throat, lobes 4. *Fr.*—globose, smooth, blue-black, seated on the calyx. Seeds hard, rough, tubercled. *Fl. t.*—June-July. *Fr. t.*—ripe July-Aug.

DISTR. :—Near the sea-coast, throughout the Konkan and N. Kanara. Common about Karwar in N. Kanara. India, near the sea, from Bombay to Malacca ; Ceylon, Andamans, Nicobar, Malaya.

DESCR. OF WOOD :—*Colour* light creamy-brown. Even-grained. Pleasantly scented. *Pores* moderately-sized, sometimes sub-divided, numerous. *Med. rays* fine, close, fairly numerous. Moderately hard. *Wt.*—60 lbs. per c.ft. (one specimen).

USES :—Wood used for rafters, planking, combs ; suitable for carving, turning and fancy work. Roots and leaves used in medicine.

The wood, if it retains its scent, should prove valuable (Gamble).

See—Medicinal Plants.

PROSOPIS SPICIGERA Linn.

FAM.—Mimosaceæ.

COM. NS. :—*G.* Hamra, Semru ; *H.* Chaunkra ; *K.* Banni, Ukai ; *M.* Saunder, Shami.

CHAR. :—A moderate-sized deciduous thorny tree. *Bark* 2-2.5 cm. thick, grey, rough, with deep longitudinal fissures and horizontal cracks. Branches unarmed or covered with scattered, nearly straight prickles. *L.*—pinnæ mostly 4, 2.5-5 cm. long ; leaflets 16-24, sessile, obliquely oblong, cuspidate, small, grey, coriaceous. *Fl.*—small, yellow, in short-peduncled axillary spikes, 5-7.5 cm. long, and terminal panicles. Calyx minute, cup-shaped. *Fr.*—pod, straight, pendulous, glabrous, contracted between seeds. 10-20 ×

.6 cm. filled with farinaceous edible substance. Seeds 5-15, brownish, oblong. *Fl. t.*—Feb.-May. *Fr. t.*—May-Aug. Sheds leaves Mar. and renews them soon after. Base of the stem often surrounded by a mass of stiff thorny branches and suckers.

DISTR. :—In the dry forests of the Deccan and Gujarat, Punjab, Rajasthan, Bundelkhand ; Western Peninsula ; Sind.

DESCR. OF WOOD :—*Colour* sap-wood large, whitish, perishable ; heart-wood purplish-brown. Coarse-grained. *Pores* small to moderate-sized, often sub-divided, generally embedded in narrow irregular concentric bands of soft tissue, filled with resin. *Med. rays* short, numerous, fine, wavy. Very hard ; tough ; not durable, readily attacked by insects. *Wt.*—58 lbs. per c.ft.

USES :—Wood used for house-building (chiefly posts, rafters and scantlings), well-construction, agricultural implements, carts and their parts. Its heating power is equal to that of *babul*. Hence it is used as fuel for steamers and locomotives. Pods are a fodder for camels and goats. The sweetish pulp from the pods is eaten raw or boiled with vegetables, butter and salt. The tree is worshipped in the Deccan at the Dasara festival.

See—Fodder Plants, Food Plants, Sacred Plants.

PSIDIUM GUAJAVA Linn.

FAM.—Myrtaceæ.

COM. NS. :—*E.* Guava tree ; *G.* Jamrudorukh, Peru, Piyara ; *H.* Amrut, Safedsafari ; *K.* Gova, Jamphal, Perala ; *M.* Jamb, Peru.

CHAR. :—A large evergreen or sub-deciduous large shrub or a small tree, 6-9 m. high ; girth about 90 cm. Stem irregularly fluted when old. *Bark* thin, smooth, greenish grey, peeling off in thin flakes. *L.*—opposite, 10-15 cm. long, oblong, or elliptic oblong, entire, pellucid-punctate beneath, intra-marginal vein present. *Fl.*—white, peduncle axillary, 1-3 flowered. *Fr.*—globose or pyriform, 5 cm. or more long. Seeds many, hard. *Fl. t.*—Apr.-May. *Fr. t.*—rainy season and winter.

DISTR. :—Cultivated all over the State in medium soils except the Konkan and N. Kanara. Chief centre is Poona district in the Deccan ; cultivated and naturalised throughout India and most tropical countries. Introduced from America.

DESCR. OF WOOD :—*Colour* greyish-brown. Even-grained. *Pores* small, numerous, in short radial groups. *Med. rays* fine, stout, numerous, indistinct. Moderately hard ; takes a fine polish ; works well and smoothly. *Wt.*—42 lbs. per c.ft.

USES :—Wood used for gun-stocks, wood-engraving, mathematical instruments, axe and spear handles. Bark and leaves are used for dyeing in Assam. Bark, leaves, flowers, fruits and gum are used medicinally. Fruit tasty, edible.

See—Medicinal Plants, Fruit Trees, Dyes and Tans.

PTEROCARPUS MARSUPIUM Roxb.

FAM.—Papilionaceæ.

COM. NS.:—*E.* Indian Kino tree, Malabar Kino tree; *G.* Bia, Bibla; *H.* Bija, Bigash, Hirdokhi; *K.* Benga, Bibla, Honnc; *M.* Bibla; *Tr.* Bijasal.

CHAR.:—A large deciduous tree, 15-18 m. high; girth 1.8-2.4 m. Bark grey, with long vertical cracks, exfoliating in small pieces of irregular shape and size. Leaflets alternate, coriaceous, 5-7, obtuse, acute or emarginate. *Fl.*—numerous, yellowish white, 1.3 cm. in diam., arranged in paniculate racemes. Petals twice the length of the calyx, waved or curled. Sheath of monodelphous stamens is sometimes deeply divided into 2. *Fr.*—pod, 2.5-5 cm. broad, articular. *Fl. t.*—May-June. *Fr. t.*—Dec.-Mar.

DISTR.:—Throughout the State in deciduous monsoon forests, scattered but not gregarious; ascends to 1,100 m. in Akrani Khandedh and Dangs. Common in N. Kanara, Konkan, Western Peninsula, Madhya Bharat and S. India: Ceylon.

DESCR. OF WOOD:—*Colour* sap-wood small; heart-wood yellowish brown with darker streaks. Close-grained, giving a red resin. *Pores* moderate-sized and large, often sub-divided, scanty, resinous, uniformly distributed in pale patches which are joined by fine, white, wavy, often interrupted concentric lines; marked on a vertical section. *Med. rays* very fine, numerous, short, uniform and equidistant. Very hard. No taste, no smell; stains yellow when damp. Seasons easily and develops a few defects (cracks and splits) which are not very serious; kiln seasons easily without degrade. Fairly heavy, strong; has a very good finish and takes a good polish. *Wt.*—55 lbs. per c.ft. An excellent and valuable timber.

USES:—Wood much used for door and window frames, posts and beams, furniture, agricultural implements, cart and boat-building; railway waggons; It has also been used for railway sleepers; also used for drums, toys, combs, cooper's work. Bark yields a red gum-resin (Kino) used medicinally and for tanning purposes.

See—Medicinal Plants, Gums and Resins, Dyes and Tans.

PTEROSPERMUM ACERIFOLIUM Willd.

FAM.—Sterculiaceæ.

COM. NS.:—*M.* Kanak champa, Karnikar.

CHAR.:—A tall handsome evergreen tree, 12-15 m. high, girth 9-1.2 m. Bark thin, grey, smooth. All younger parts tawny-tomentose. *L.*—26-36.4 cm. × 15.6-31.2 cm., simple or lobed, ovate-oblong, or obovate-oblong, peltate or cordate at the base, 7-12-nerved, entire or coarsely toothed, covered on the upper side with stellate-pubesence when young, at length glabrous above, and grey tomentose beneath, coriaceous; petiole round, striated. Stipules many-cleft, caducous. *Fl.*—13-15.6 cm. diam., white, fragrant, with many-cleft bracteoles. Peduncles axillary, 1-3-flowered, very short. Sepals 5, linear-oblong, revolute, thick coriaceous, rusty

tomentose outside, villous within. Petals 5, linear-oblong or obliquely cuneate, staminodes club-shaped. Ovary oblong, rusty-tomentose, 5-angled, 5-celled. *Fr.*—capsule, 10·4-15·6 cm., woody, 5-angled, 5-celled, 5-valved, covered with a dark-brown, scurfy tomentum. Seeds numerous, ovoid, compressed, smooth, with large, thin-membranous wings. *Fl. t.*—hot season. *Fr. t.*—cold season.

DISTR. :—Konkan, Southern Ghats of N. Kanara in evergreen forests; abundant on Devimani ghat. Sub-Himalayan tract from the Jumna eastwards, Khasia hills, Bengal: Burma, Andamans. Often planted for ornament.

DESCR. OF WOOD :—*Colour* sap-wood white, heart-wood red. *Pores* scanty, small, oval or elongated, generally sub-divided, visible on a longitudinal section. *Med. rays* fine, very numerous, undulating, not prominent, uniform and equidistant. Innumerable very fine concentric lines. Soft to moderately hard, heavy; takes fine polish. *Wt.*—about 45 lbs. per c.ft.

USES :—Wood very good for matches and inside match-boxes, and good for outside boxes. Suitable for carpentry and sometimes used for planking. Leaves are used as plates and for packing tobacco. Down is used to stop bleeding.

PTEROSPERMUM HEYNEANUM Wall.

FAM.—Sterculiaceæ.

COM. NS. :—K. Kesali, Copin.

CHAR. :—A middle-sized tree, trunk tolerably straight, sometimes 30 m. high with 1 m. diameter. Young parts covered with stellate-rusty pubescence. The whole of the tree is of a pale tawny colour. *Bark* brown, rough 67 cm. thick. *L.*—10·4-15·6 × 5·2-8·13 cm., alternate, oblong-acuminate; repand-toothed, or rarely lobed at the apex, sub-cordate, cuneate, rarely sub-peltate, 5-nerved at the base, coriaceous, glabrous when adult on the upper side, white-tomentose beneath, with prominent nerves; petiole tawny-tomentose. Flowers large, white, fragrant. Bracteoles persistent, deeply divided. Peduncles shorter than the petioles, axillary. Sepals 5, linear, revolute, 5·2 cm. Petals 5, obliquely-obovate, spreading. Staminodes linear. Ovary oblong, villous, 5-celled. *Fr.*—capsule, 5·2 cm. long, acute, obscurely 5-angled, woody, covered with furfuraceous pubescence. Seeds 8 in each cell, produced into a membranaceous acute wing. *Fl. t.*—Apr.-May. *Fr. t.*—Nov.-Jan.

DISTR. :—Endemic in moist forests along the ghats from Konkan and southwards in W. Peninsula; abundant in N. Kanara in Sirsi Siddapur Talukas. Found also in Dharwar. Common in Cuddappah.

DESCR. OF WOOD :—*Colour* light-red. Structure similar to that of *P. acertifolium*. *An. rings* marked by a wavy dark line without pores. Hard. *Wt.*—40 lbs. per c.ft.

USES :—Not known.

PTEROSPERMUM SUBERIFOLIUM Lam.

FAM.—Sterculiaceæ.

COM. NS. :—M. Muchkund.

CHAR. :—A moderate-sized tree; trunk straight. *L.*—5.2-15.6 × 2.6-5.2 cm., cuneate-oblong, shortly-acuminate, coarsely-toothed or somewhat lobed at the apex, obliquely cordate or sub-cordate, 5-9 nerved at the base, coriaceous, covered when young with a rusty tomentum, becoming soon glabrous above, and very white-pubescent beneath. Bracteoles very caducous. Peduncles axillary, twice as long as the petiole, 1-3-flowered. *Fl.*—about 3.2 cm. diam., light-yellow, fragrant. Sepals 5, slightly united at the base, oblong linear, revolute, covered with ferruginous tomentum on the outside. Petals 5, linear-oblong, obtuse, equalling the sepals. Staminal column short, divided at the top into 5 linear staminodes, with 8-stipitate anthers between each; anther-cell linear parallel. *Fr.*—capsule, 2.6-5.2 cm., obovoid, obsoletely angular, 4-5-valved, covered with furfuraceous pubescence. Seeds 2-4 in each cell, usually 2, obliquely oval, compressed, surmounted by small, thin, membranous wing. *Fl. t.*—hot season. *Fr. t.*—rainy season.

DISTR. :—Forests of Konkan and Kanara; Orissa, Madras, Ceylon. Cultivated on account of its fragrant flowers.

DESCR. OF WOOD :—*Colour* light-red. Close-grained. *Pores* small, scanty, often sub-divided. *Med. rays* closely packed, fine, the distance between them much less than the diam. of the pores. Occasional, dark, narrow, concentric lines, not continuous, but often breaking off suddenly. Tough, moderately hard. *Wt.*—43 lbs. per c.ft.

USES :—Wood used for buildings, poles of carts, oars, gun-stocks, side-pieces of bed-steads, etc., also good fuel.

PUNICA GRANATUM Linn.

FAM.—Punicacæ.

COM. NS. :—*E.* Pomegranate Tree; *G.* Dadam; *H.* Anar, Dhalim, Dharimb; *K.* Dadima, Mulidalimb; *M.* Dalimb.

CHAR. :—A large deciduous shrub or a small tree, branches spinescent. *Bark* grey, thin, peeling off in small flakes. *L.*—opposite, 2.5-6.3 cm. long, oblong-lanceolate, obovate, entire, pellucid-punctate, shining above. *Fl.*—sessile, axillary, solitary, or 2-4 together, large, orange-red; petals 5-7, wrinkled, obovate, inserted between the calyx-lobes. *Fr.*—3.8-7.5 cm. or above in diameter, globose, tipped with calyx-limb, rind thick, leathery, interior separate. Seeds many with pink juice. *Fl. t.*—Apr.-July.

DISTR. :—Cultivated in rather poor soils. Extensively cultivated in the eastern part of Poona district, Ahmedabad and Ahmednagar districts. Cultivated in many parts of India. Wild in N. W. India, Persia, Kabul and Baluchistan.

DESCR. OF WOOD :—*Colour* light-yellow, with a small darker coloured irregular heart-wood. Compact, close-grained. *Pores* very

small, single or sub-divided or in radial strings. *Med. rays* very fine, very numerous. *Med. patches* frequent. Hard, heavy; takes a fine polish. *Wt.*—56 lbs. per c.ft.

USES :—Wood is a possible substitute for boxwood for engraving. Fruit is generally eaten. Flowers are handsome and give a light-red dye. Bark and fruit-rind are used for tanning and dyeing leather. Root-bark, flowers and fruits used medicinally.

See—Medicinal Plants, Dyes and Tans, Fruit Trees.

PUTRANJIVA ROXBURGHII Wall.

FAM.—Euphorbaceæ.

COM. NS. :—*H.* Jaiput, Jivaputrak, Joti, Patji, Putijia, Putra-jiva; *K.* Aumani, Putra-jivi; *M.* Jiwan-putra, Putran-jiva.

CHAR. :—An evergreen tree with pendent branches, 9-15 m. high; girth 1.2-1.5, sometimes 2.7 m. *Bark* dark-grey, whitish when young, with numerous horizontal oblong lenticels, corky. *L.*—7.5-12.5 × 2.5-4 cm., elliptic-oblong, acute at both ends, sub-coriaceous, often unequal at the base, serrulate, glabrous and shining above; stipules deciduous. *Fl.*—small, yellow; male numerous, sub-sessile in globose axillary heads; calyx 3-5-cleft; stamens 3; filaments more or less connate; female flowers solitary or 2-together, axillary, pedunculate; calyx segments 5-6; ovary pubescent, 3-celled; styles 3, dilated into large usually triangular stigmas. *Fr.*—oval, 7-10 by 5-8 lin., smooth, white; not pointed, very hard, rugose, 1-seeded. *Fl. t.*—Mar.-May. *Fr. t.*—ripe next Feb.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara; nowhere common. Kanheri and Alibag jungles, Khandala, sometimes planted. Throughout tropical India, wild and cultivated. From the lower Himalayas eastwards and southwards to Pegu and Ceylon.

DESCR. OF WOOD :—*Colour* grey. Close-grained. *An. rings* marked by prominent concentric lines. *Pores* small to moderate-sized, scanty, sub-divided or in short radial lines, between closely packed, uniform, fine *med. rays*, which bend round the pores. Very numerous, very fine transverse bars joining the rays as in Anonaceæ. Moderately hard, durable. *Wt.*—48 lbs. per c.ft.

USES :—Wood used in making tools and for turning (Brandis). Wood adapted for lathe (Beddome). Nuts are strung up in rosaries and necklaces for children to keep them in health, hence the name Putran-jiva (life of the child). Leaves are lopped for fodder.

See—Fodder Plants.

PYGEUM GARDNERI Hook. f.

FAM.—Rosaceæ.

COM. NS. :—*K.* Sugnigari; *M.* Daka, Kaula.

CHAR. :—A middle-sized evergreen tree, glabrous except the inflorescence, 7.5-12 m. high; girth 1.2-2.4 m. *Bark* brown, thin,

rough. *L.*—10-15 cm., alternate, coriaceous, entire, glabrous, ovate-oblong or ovate-lanceolate, acuminate, base acute, or rounded, equal or unequal; base glands none; petioles glabrous, of young leaves silky. *Fl.*—yellowish-white, on stout pedicels disposed in racemes 7.5-10 cm. long. Calyx-tube urceolate; limb 10-12, lobes obtuse. Petals none. Stamens 12. Ovary hirsute; style exserted, smooth, obtusely and transversely 2-lobed. *Fl. t.*—rainy and cold seasons. *Fr. t.*—Mar.-May.

DISTR. :—Mahabaleshwar and other ghats of the Bombay State. Nilagiris.

DESCR. OF WOOD :—*Colour* sap-wood dark-red, heart-wood whitish. Coarse-grained. *An. rings* indistinct. *Pores* small, single or divided, sparsely distributed or in a radial or oblique lines of 3-5-together. *Med. rays* fine, moderately broad, numerous. *Wt.*—50 lbs. per c.ft. (Mahabaleshwar wood).

USES :—Wood is said to be used for making boxes, planks, rafters and beams.

RANDIA DUMETORUM Lam.

FAM.—Rubiaceae.

COM. NS. :—*E.* Emetic-nut; *G.* Midhola, Mindhola; *H.* Karhar, Mainphal; *K.* Kerigida, Mangarikai; *M.* Gelphal, Gela.

CHAR. :—A small deciduous tree. *Bark* grey, scaly, spines horizontal, often long and rigid, 2.5-4 cm. *L.*—2.5-5 × 2.5 cm., obovate, glabrous or pubescent, obtuse or sub-acute, from cuneate base, narrowed into a short-petiole; stipules ovate-acuminate. *Fl.*—white, soon becoming yellow, fragrant, solitary, rarely 2-3, on short peduncles at the end of short lateral branchlets. Calyx strigose, with stiff adpressed hairs. Corolla 1.3-2 cm. diam.; divisions oval or oblong. *Fr.*—berry, globose or ovoid, 2-4 cm. long, glabrous or pubescent, yellowish when ripe. Seed imbedded in pulp, compressed. *Fl. t.*—Mar.-June. *Fr. t.*—Nov.-Mar.

There is a distinct arborescent variety common on the laterite at Mahabaleshwar (1350 m.), with evergreen leaves and decurved margins.

DISTR. :—Common throughout the State in deciduous monsoon and dry forests; from Khandesh southwards, Konkan, S. M. Country and Kanara. Throughout India: Ceylon, Burma, Sumatra, S. China, E. Tropical Africa.

DESCR. OF WOOD :—*Colour* white or light-brown. Close and even-grained. *An. rings* marked by a belt without pores. *Pores* very small, evenly distributed. *Med. rays* fine and very fine, very numerous. Compact, hard. *Wt.*—54 lbs. per c.ft.

USES :—Wood used for agricultural implements, combs and walking-sticks; a possible substitute for boxwood for engraving; used also for fences and as fuel. Bark and fruit are used medicinally. Fruit is also used to poison fish and when ripe is roasted and eaten. Leaves used as fodder for cattle.

See—Medicinal Plants, Fish Poisons, Fodder Plants.

RANDIA ULIGINOSA D.C.

FAM.—Rubiaceæ.

COM. NS. :—G. Kaurio ; H. Bharani, Katul, Panar, Pindallu ; K. Banbugri, Kare, Pendri ; M. Panela, Pindra, Telphetra.

CHAR. :—A small deciduous tree, 4·5-6 m. high ; girth of ·6 m. Bark reddish-brown, exfoliating in thin flakes ; armed with rigid, straight, 4-sided branches ; spines short, straight, or none. L.—5·20 × 2·5-10 cm. obovate or oblong, obtuse, shining, cuneate at the base ; petiole short and slender ; stipules triangular. Fl.—solitary, white or cream-coloured, fragrant, either large and sessile, or small and peduncled ; corolla of the large form 2·5-5 cm. diam, lobes rounded, mouth of the tube closed with a ring of white hairs ; of the small form the tube is glabrous within. Fr.—berry, ·5 cm. long, yellow, crowned with the persistent calyx, 2-celled, ellipsoid. Seeds compressed, smooth. Fl. t.—May-June. Fr. t.—Dec.-Feb. Leaves shed Feb. ; new leaves Apr.

DISTR. :—Throughout the State ; often in abandoned rice-fields ; common in deciduous forests. Sub-Himalayan tract from the Jumna eastwards, Oudh, Bengal, and throughout India : Ceylon, Burma.

DESCR. OF WOOD :—Colour whitish-grey ; no heart-wood. Close-grained. An. rings marked by a narrow belt without pores. Pores small and very small, numerous and uniformly distributed. Med. rays fine and very fine, very numerous, distinctly visible on a radial section. Hard. Wt.—48 lbs. per c.ft.

USES :—A possible substitute for box-wood for engraving. Fruit is eaten either cooked or roasted. Leaves are fodder for cattle.

See—Fodder Plants, Fruit Trees.

RHIZOPHORA MUCRONATA Lam.

FAM.—Rhizophoraceæ.

COM. NS. :—M. Kandal.

CHAR. :—A small evergreen glabrous tree, 4·5-7·5 m. high ; girth 3-6 m. Bark brown, fairly smooth, with vertical clefts. L.—7·5-18 × 4-10 cm., oval, or elliptic-oblong, mucronate, narrowed at the base, rather long-petioled, coriaceous. Fl.—pedicellate, greenish-white, rather large, sweet-scented, on peduncles arising from the axils of leaves, longer than the petioles, about 3-6 flowered. Calyx segments triangular. Petals villous at their involute margins. Stamens 8. Fr.—about 2·5 cm. diam., ovoid or obconic, furrowed, supported at the base by the reflexed limb of the calyx. Radicle of the seed, germinating within the fruit on the tree, about ·75 m. long. Fl. t.—Aug.-Dec.

DISTR. :—Common in the salt marshes and muddy tidal flats along the coast of the States of Bombay, Madras, Bengal : Sind, Burma, Malacca, Andamans ; also found in Africa and Australia.

DESCR. OF WOOD :—Colour sap-wood light red ; heart-wood dark-red. Close-grained. Pores small to moderate-sized, often sub-divided, fairly numerous ; in alternate bands with few pores and

many pores, so that a section of the wood shows alternately dark and light. These bands may represent *an. rings*. *Med. rays* fine, wavy, numerous, uniform, equidistant; the distance between the rays equal to about twice the transverse diameter of the pores. On a radial section they give a pretty silver-grain. Extremely hard; splits and warps a little in seasoning; rather heavy, durable. *Wt.*—66 lbs. per c.ft.

USES :—Wood is good but rarely used. Bark used for tanning.

See—Dyes and Tans.

SACCOPETALUM TOMENTOSUM Hook. f. & Th.

FAM.—Anonaceæ.

COM. NS. :—*H. Kirua*, Karri, Umbi, Hum; *K. Wumb*, Hessare; *M. Kirua* Karri, Umbi, Hum.

CHAR. :—A large deciduous tree with a straight stem, 15 m. high with a girth of 1.5-1.8 m. Young shoots clothed with soft silky tomentum. *Bark* 9 cm. thick, of various shades, sometimes black, deeply cracked. *L.*—10.4-15.6 × 6.8 cm., elliptic or ovate-oblong, acute, rounded or cordate at the base sometimes glabrous when old and somewhat rough above, pubescent and pale beneath. *Fl.*—greenish-yellow with a broad streak of brown, in leaf opposed, or sub-terminal, 2-4 flowered cymes on short peduncles; pedicels slender, downy, 5.7-5 cm. Sepals and outer petals nearly equal, lanceolate; inner petals longer, oblong, obtuse downy. Carpels 2.6 cm. diameter, purple, tomentose, 3-4 seeded. *Fl. t.*—hot season. *Fr. t.*—rainy season. Leaves are shed in Mar. and renewed in Apr.

DISTR. :—Forests of the Konkan; Travancore and throughout the Peninsula; Bihar, Orissa, Tarai of Nepal, Oudh. Not uncommon in sal forests.

DESCR. OF WOOD :—*Colour* yellow to olive-brown. Close-grained. No heart-wood. Cross bars regular, narrow, about 150 per inch. (60 per cm.). No *an. rings*. *Pores* small and moderate-sized, fairly numerous. *Med. rays* moderately broad, numerous, showing a well marked silver grain. Moderately hard, smooth, durable; does not warp. *Wt.*—about 50 lbs. per c.ft.

USES :—Wood is of little economic importance; used for building huts, carving and for oars. Leaves are used as cattle fodder.

See—Fodder Plants.

SAGERAEA LAURIFOLIA Blatt.

FAM.—Anonaceæ.

COM. NS. :—*M. Sajeri*, Kochrik, Harkinjal, Undie.

CHAR. :—A middle-sized, beautiful ornamental laurel-like tree. *Bark* dark coloured, scaly. Branches glabrous. *L.*—13-23.4 cm. × 6.5-7.8 cm.; thick, coriaceous, acute or obtuse at the apex, rounded or slightly attenuate at the base, glabrous and shining above, pale

beneath. *Fl.*—white, bisexual, crowded in fascicles of 10-15 on woody tubercles; pedicels about 1.3-2.6 cm.; bracteoles several, scaly, basal. Sepals orbicular, cohering at the base. Petals 1-3.4 cm. broad ovate, concave. Stamens 12-18. Ripe *carpel* 2.6 cm. in diameter, globose, glabrous, smooth, sub-sessile. *Fl. t.*—Oct.-Nov.

DISTR. :—Evergreen forests of the Konkan (Matheran, Nagotana, Jawhar) and Travancore. Alt. 750 m.

DESCR. OF WOOD :—*Colour* light yellow, sometimes red. Even-grained, handsome. Cross bars prominent, not numerous, many, regular. *Pores* moderate-sized to large, very scanty, often filled with a white substance. *Med. rays* moderately-broad, long, not numerous but very regular. It is tough, elastic, hard, rather heavy. *Wt.*—49 lbs. per c.ft.

USES :—Used for cart-shafts. Probably suitable for furniture and fancy work. Leaves are used for fomentation in rheumatism.

SALIX BABYLONICA Linn.

FAM.—Salicaceæ.

COM. NS. :—*E.* Weeping-willow.

CHAR. :—A deciduous tree attaining 15 m. high, with drooping branches. *Bark* grey. *L.*—7.5-15 × 1.8 cm., narrowly lanceolate. *Fl.*—appearing with the leaves. Catkins very slender. The male catkins 1.3-2.5 cm. long, the female 2.5 cm. long. *Fr.*—capsule, sessile, glabrous.

DISTR. :—Cultivated in gardens at Poona, Bombay and elsewhere throughout the State. There was a plant in Parel Garden, Bombay, reared from a cutting of the tree which grew over the tomb of Napoleon at St. Helena (Graham). Cultivated in Northern India both in the plains and upto 2,700 m. Indigenous probably in Central Asia and Persia.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* marked by a line and smaller and less numerous autumn-wood pores. *Pores* small, numerous, evenly distributed. *Med. rays* fine, numerous, regular. Soft, porous.

USES :—It has been used to plant for the protection of canal banks and to reclothe slips in wet places. Branches can be used for basket-making.

SALIX ICHNOSTACHYA Lindl.

FAM.—Salicaceæ.

COM. NS. :—No common names.

CHAR. :—A moderate-sized tree. *L.*—7.5-15 × 2.5 cm., lanceolate or elliptic-lanceolate, acute or acuminate, sub-coriaceous, smooth and shining above, glaucous beneath, base acute. *Fl.*—catkins softly woolly, often androgynous (the males and the female mixed in the same catkin), bracts densely woolly. *Fr.*—capsule, nearly sessile, globose-ovoid, densely woolly. *Fl. t.*—Oct.-Nov.

DISTR. :—Konkan and N. Kanara, along river banks. Western Peninsula, Mysore.

DESCR. OF WOOD :—Practically the same as the *S. tetrasperma*.

USES :—Same as *S. tetrasperma*.

SALIX TETRASPERMA Roxb.

FAM.—Salicaceæ.

COM. NS. :—Indian Willow ; *H.* Baishi, Bed, Bent ; *K.* Nirangi ; *M.* Bocha, Bitasa, Walunj.

CHAR. :—A moderate-sized deciduous tree, 9-12 m. high ; girth 1.5-1.8 m. *Bark* rough with deep vertical fissures. Young shoots silky pubescent. *L.*—5-12.5 × 1.5-2 cm., lanceolate, acute or acuminate, usually serrulate, green and glabrous above, white and silky beneath when very young. *Fl.*—appearing after the leaves ; catkins hairy, 5-12.5 cm. long ; peduncles silky villous, leafy at the base. *Male fl.* sweet-scented, yellowish, sessile. *Female fl.* pedicellate, greenish. *Fr.*—capsule, small on a long slender stalk. Seeds 5-6. *Fl. t.*—Oct. (cold season). *Fr. t.*—hot season. Renews leaves Feb.-Mar.

DISTR. :—Common on the river banks and in moist places at Mahabaleshwar (vale of the Yenna river). S. M. Country in various places. Planted along road-sides near about Belgaum (chiefly male trees). Konkan ghats. Throughout India : China, Malay Peninsula and Archipelago.

DESCR. OF WOOD :—*Colour* red. Even-grained. *An. rings* indistinctly marked by lines. *Pores* small, often sub-divided, very numerous, uniformly distributed. *Med. rays* fine, numerous, distinct, bent round the pores. Soft, porous. *Wt.*—31 lbs. per c.ft.

USES :—Wood used for gunpowder charcoal. It is used for posts and planks in Assam (Mann). Twigs are made into baskets. Bark is used for tanning and is said to be used as febrifuge. *L.*—lopped for cattle fodder.

See—Dyes and Tans, Fodder Plants.

SALMALIA MALABARICA Scholt & Endl.

(BOMBAX MALABARICUM DC.)

FAM.—Malvaceæ.

COM. NS. :—*E.* The cotton tree, Silk-cotton tree ; *G.* Sawar ; *H.* Pagun Semul, Semur, Shembal ; *K.* Buruga, Burla, Sauri ; *M.* Savar ; *Tr.* Semul.

CHAR. :—A very large tree ; trunk straight ; stem generally with large buttresses at the base. Branches in whorls of 5-7, spreading nearly horizontally. Height 18-27 m. with a girth 3.6-4.5 m. *Bark* grey, when young with conical prickles with corky base, when old with long irregular vertical cracks. *L.*—digitate, deciduous, 5-7-foliate ; leaflets generally 10-4-20-8 cm. long, elliptic-oblong to oblong-lanceolate, acuminate or cuspidate at the apex, narrow at the base,

glabrous, entire ; common petiole as long as or longer than the leaflets. *Fl.*—numerous, large, scarlet or occasionally white, on short pedicels, fasciated near the ends of branches. Bracteoles 0. Calyx 2.6 cm., long, cup-shaped, thick, coriaceous, irregularly cleft into 3-4 short, obtuse lobes, smooth externally, silk-hairy within. Petals 5, oblong, fleshy, recurved, tomentose externally, pubescent or nearly glabrous inside. Staminal tube shorter than the filaments ; the latter thick and shorter than the petals, multi-seriate ; 5 innermost divided at the top, each bearing an anther ; 10 intermediate ones simple and shorter ; the outer numerous and are united into 5-clusters. Anthers reniform, contorted, 1-celled. Ovary 5-celled. Style clavate ; stigmas 5. *Fr.*—capsule, 6-7 in., oblong, blunt, obsoletely 5-angled, woody. 5-valved. Seeds numerous, obovate, smooth, enveloped in silky fine wool. *Fl. t.*—Feb.-Mar. *Fr. t.*—Apr.-May. Sheds leaves in Nov. and continues leafless till Apr.

DISTR. :—Common in Gujarat, Konkan and S. M. Country ; Sub-Himalayan tract from the Indus eastwards ascending to 1,750 m. Common in both Peninsulas and often cultivated.

DESCR. OF WOOD :—*Colour* white when fresh cut, turning slightly darker on exposure. *Pores* very scanty, very large, often oval or divided into compartments. *Med. rays* fine to broad, numerous, not prominent. *Pores* and silver-grain prominent on a vertical section. No heart-wood ; no *an. rings*. Very soft, perishable, weak. Prone to rapid fungus and insect attack ; must be dried immediately after conversion. Kiln seasoning the surest and best method ; very easy to saw and work ; planes to a good surface. *Wt.*—23 lbs. per c.ft.

USES :—Wood is put to a large variety of uses in India e.g.—coffins, packing cases for tea, toys, scabbards, planking, fishing floats, canoes, etc. One of the most commonly used timbers for match-box manufacture. If properly treated with preservatives it could command a very wide range including wall-boards, insulation boards, shingles, and light furniture ; is used for plywood ; makes a fair quality of wood-pulp with good bleaching power. The economic value of this timber tree lies mainly in its rapid growth and volume produced. This may under favourable conditions yield returns higher than those yielded by trees with much more valuable timbers. The tree yields a brown gum used in medicine. Calyx of the flower-bud is eaten as a vegetable. The cotton covering the seeds is used for stuffing pillows.

See—Fibres, Gums and Resins.

SALVADORA OLEOIDES Dcne.

FAM.—Salvadoraceæ.

COM. NS. :—*G. Khakananutela ; H. Jhal ; M. Kinkanela, Pilu.*

CHAR. :—A large evergreen shrub or a small tree with a short twisted or bent trunk. *Bark* whitish-grey ; branches stiff, divergent, whitish. *L.*—4.7-5 × 3.1-3 cm., whitish-green, coriaceous and somewhat fleshy when mature, linear or elliptic-lanceolate, often mucronate, glabrous. *Fl.*—greenish-white, sessile, in erect axillary

panicled spikes 2.5-4 cm. long, often clustered. Calyx lobes 4, cleft about half-way down. Corolla little longer than calyx, deeply cleft, lobes obovate-oblong, obtuse. *Fr.*—small, globose, yellow when ripe. *Fl. t.*—Jan.-Apr. *Fr. t.*—June.

DISTR. :—In dry places and saline soils. Often associated with *S. persica*. Apparently confined to Gujarat in the State; Punjab, Rajasthan: Sind, Aden.

DESCR. OF WOOD :—*Colour* light-red, with a small irregular purple heart-wood. *Pores* large and small, oval, often sub-divided, surrounded by irregular patches of soft tissue, which are joined into wavy, irregular, zigzag, concentric bands, scanty but much more numerous and prominent than in the *S. persica*, prominent of a vertical section. *Med. rays* fine, numerous, distinct, at unequal distances. Moderately hard. *Wt.*—54 lbs. per c.ft. (with heart-wood) 38 lbs. per c.ft. (no heart-wood).

USES :—Wood used for building purposes, agricultural implements, etc. Makes a bad fuel. Seeds yield green oil used in medicine. Fruit edible. Branches are lopped off for camel fodder.

See—Fruit Trees, Fodder Plants, Oils.

SALVADORA PERSICA Linn.

FAM.—Salvadoraceæ.

COM. NS. :—*E.* Mustard Tree of Scriptures, Tooth-brush tree; G. Kharigal, Pilu, Piludi; H. Jal, Pilu; K. Goni; M. Khakan, Pilu.

CHAR. :—A large much-branched ever-green shrub or a small tree, sometimes 9-12 m. high with girth 1.2-1.5 m. Branchlets pendulous. *Bark* thin, grey. *Leaves* 2.5-5 × 2.5 cm., oval or ovate to narrow-lanceolate, entire, coriaceous, very smooth and shining and glaucous on both sides. *Fl.*—greenish-white on slender pedicels arranged in axillary and terminal lax panicles longer than the leaves. Calyx-lobes 4 parted, ciliate. Corolla cleft almost to the base into 4 generally reflexed lobes. *Fr.*—berry globose, smooth, fleshy, red when ripe, embraced at the base by the persistent calyx. *Fl. t.*—Nov.-May; more or less all the year round. *Fr. t.*—rainy and in some places cold season. Old leaves shed in Apr., new ones reappearing almost simultaneously.

DISTR. :—In the dry districts of the State; S. M. Country, Dharwar and Belgaum districts; often on the bunds of tanks and in open places near villages of the black soil country; also found in saline soils and littoral forests near the coasts of Gujarat, the Konkan and N. Kanara. Drier parts of India, often planted near Muslim tombs: Sind, Ceylon, W. Asia, Egypt, Abyssinia.

DESCR. OF WOOD :—*Colour* white. *Pores* small in short radial lines, enclosed in oval patches of soft tissue, very scantily distributed, but prominent on a vertical section. Numerous fine, interrupted, concentric bands of soft tissue, separating broader bands of firm texture, in which the fine and numerous *med. rays* are distinctly visible. Soft; easy to work; takes good polish; not attacked by white ants. *Wt.*—45 lbs. per c.ft.

USES :—Wood is very little used as it is small. Twigs are used as tooth-cleaners. Leaves are eaten as salad. Young branches and leaves are a favourite fodder with camels in Sind. Bark, leaves, fruit seeds and oil are used medicinally.

See—Medicinal Plants, Fodder Plants.

SAMADERA INDICA Gaertn.

FAM.—Simarubeaceæ.

COM. NS. :—No common names.

CHAR. :—A small tree, with stout branches, 9-10·5 m. high. *Bark* pale yellow, transversely cracked. *L.*—15·6-28 × 7·8 cm. oblong or elliptic-lanceolate, acute or obtuse at the apex, narrow at the base, coriaceous, fleshy, glabrous, shining, quite entire, generally furnished with 2 hollow glands at the base near the insertion of the petiole, and often with similar ones spread over the blade; petiole thick. *Fl.*—yellowish-white or purplish, numerous, in dense umbels. Peduncles very long; pedicels small. Calyx segments 4-5, small, persistent in fruit. Petals linear-oblong. Stamens twice as many as the petals. Filaments with a scale at the base. Ovary generally 4-celled. *Fr.*—drupe, 4-2·6 cm. with a very thick pericarp. *Fl. t.*—cold season. *Fr. t.*—Mar.-Apr.

DISTR. :—Throughout south Konkan jungles; jungles near Goa; along river banks. Indigenous on the Malabar coast; Ceylon.

DESCR. OF WOOD :—*Colour* light-yellow. No heart-wood. *Pores* small, very scanty. *Med. rays* very fine, uniform, closely packed. *Soft.* *Wt.*—26 lbs. per c.ft.

USES :—Wood used for making clogs. Wood and bark are bitter, used as febrifuge. Seeds give oil used for lighting.

See—Oils.

SANTALUM ALBUM Linn.

FAM.—Santalaceæ.

COM. NS. :—*E.* The White-Sandal-wood tree; *G.* Suket; *H.* Chandan, Chandal, Sandal; *K.* Gandada, Gandha; *M.* Chandan.

CHAR. :—A small evergreen glabrous tree with slender drooping branches. *Bark* dark-grey, nearly black, rough, with short vertical cracks, inner substance dark red. *L.*—opposite, 4·6·3 × 1·6·3·1 cm. elliptic-lanceolate, sub-acute; entire, thin, base acute. *Fl.*—brownish purple, inodorous, in terminal and axillary paniculate cymes shorter than the leaves. Perianth campanulate; limb of 4 valvate triangular segments. Stamens 4. *Fr.*—globose, 1·3 cm. diameter, purple-black; endocarp hard, ribbed. *Fl. t.*—Mar.-Aug. *Fr. t.*—cold and hot seasons.

DISTR. :—Western Peninsula from near Poona southwards; indigenous throughout the dry districts of the State; also abundant in some of the dry deciduous forests of N. Kanara; often along the bunds of tanks and in hedges; dry regions of S. India, Mysore, Coorg, Nilgiris, Coimbatore.

DESCR. OF WOOD :—*Colour* sap-wood white and scentless ; heart-wood yellowish brown, strongly scented. Very close-grained and oily. *An. rings* distinctly marked by more numerous and slightly larger pores in the spring-wood. *Pores* small, numerous, evenly distributed. *Med. rays* short, fine, numerous, uniform and equidistant. Hard. *Wt.*—about 60 lbs. per c.ft.

The best scented wood is obtained from rich soils mixed with rock, but the scent becomes less where the soil is rich and without stones. (P. Lushington).

USES :—Wood used for carving, manufacture of boxes, frames and other small fancy articles, and for burning in Parsi temples ; a valuable essential oil is obtained by distillation from the wood and the roots, which latter yield the largest quantity ; it is used in perfumery and in medicine. The seeds yield a thick viscid oil. Fruits are eaten in times of scarcity.

See—Medicinal Plants, Oils, Food Plants .

SAPINDUS TRIFOLIATUS Linn.

(SAPINDUS LAURIFOLIAS Vahl.)

FAM.—Sapindaceæ.

COM. NS. :—*E.* Soap-nut tree ; *G.* Arilha ; *H.* Ritha ; *K.* Anthuvala, Burugukayi, Kugala, Phenilu ; *M.* Ritha, Ringin.

CHAR. :—A large handsome tree, trunk straight, girth 9-1.2 m. *Bark* shining, grey, with rough deciduous scales. *L.*—2.1-36 cm. long, paripinnate, alternate. *Leaflets* 4-6, 8.1-19.5 × 4-8 cm., ovate or oblong-lanceolate, acuminate at the apex, sometimes obliquely-sided at the base, entire, glabrous, shining above, soft-pubescent beneath, on petiole 2-3 lin. *Fl.*—numerous, small, dull-whitish, in large, terminal, much-branched panicles which are clothed with rusty pubescence. *Calyx* rusty pubescent on the outside. *Petals* covered externally with adpressed hairs, sometimes furnished on inner surface with a membranous scale, fringed with long white hairs. *Fr.*—fleshy, 3-lobed, soft when ripe, of a brownish colour. *Seed* round, obovate. *Fl. t.*—Oct.-Dec. *Fr. t.*—Feb.-Apr.

Note :—There are two forms of this tree, usually regarded as distinct species (*S. emarginata* and *S. laurifolia*) having emarginate leaves, pubescent beneath, and acuminate glabrous leaves respectively.

DISTR. :—Throughout the State ; usually planted about villages. Both the varieties are found in N. Kanara. *Var. laurifolia* is indigenous on the W. ghats in evergreen forests, Madras State, Aravali hills, both wild and cultivated.

DESCR. OF WOOD :—*Colour* yellow. Close-grained. *Pores* scanty, moderate-sized, surrounded by patches of light tissue, which are joined together in more or less concentric wavy bands, between which are darker bands without pores ; pores often filled with white mineral matter. *Med. rays* very fine, numerous. Hard, heavy. *Wt.*—56-64 lbs. per c.ft.

USES :—Wood rarely used for buildings and carts. Fruit largely used as a substitute for soap ; and also in Indian medicines.

See—Medicinal Plants.

SAPIUM INDICUM Willd.

FAM.—Euphorbiaceæ.

COM. NS. :—M. Hurna.

CHAR. :—A small evergreen tree, 6-7·5 m. high. Bark smooth, grey. L.—7·5-12·5 cm. long, elliptic-lanceolate, serrate. Racemes spiciform, solitary. Male fl.—clustered, sub-sessile. Female fl.—larger, pedicellate. Fr.—2·5 cm. in diameter, glabrous, woody when ripe.

DISTR. :—Various parts of South Konkan ; occasionally planted but not indigenous in the State. Bay of Bengal from Sundribans to Tenasserim.

DESCR. OF WOOD :—Colour white with small brown heart-wood. Pores moderate-sized and large, oval, often sub-divided. Med. rays equally distributed, very fine. Closely packed. The transverse diameter of the pores is greater than the distance between the rays. Soft. Wt.—29 lbs. per c.ft. (Sundribans).

USES :—Wood is chiefly used for fuel. The juice of the tree is very poisonous. Seeds are used to poison fish.

See—Poisonous Plants, Fish Poisons.

SAPIUM INSIGNE Benth.

FAM.—Euphorbiaceæ.

COM. NS. :—H. Khina, Khirni, Linda, Landa ; K. Kurda, Nanaka ; M. Dudla, Hure, Ura.

CHAR. :—A middle-sized glabrous, deciduous tree, with a thick milky juice, thick branches and bright green foliage, usually 6-9 m. high, (15-18 m. under favourable conditions) ; girth 1·2-1·8 m. (3·3-3·6 m. under favourable conditions). Bark grey, smooth, shining, with large, broad, longitudinal wrinkles when young ; very rough, corky and deeply fissured when old. L.—10-20 × 4-9 cm., oblong-lanceolate, acuminate, dentate, membranaceous ; petiole 2·5-5 cm. with 2 circular glands at the apex. Fl.—small, sessile, in long, naked, terminal spikes ; male and female flowers in distinct branches ; bracts minute ; male many-flowered ; female 1-flowered. Ovary, 2-3-celled on the same or different plants. Fr.—capsule, .8 cm., ovoid, 2-3-celled. Fl. t.—Dec.-Feb. Fr. t.—May-June. Leafless during the cold season ; foliage renewed about the beginning of rains.

DISTR. :—Common near the coast of the Konkan and N. Kanara on dry rocky soil, usually on laterite, also in moist forests on the ghats. Deccan, Lonavala, Khandala. Western Peninsula from the Konkan southwards, Sub-Himalayas, Assam : Chittagong, Ceylon.

DESCR. OF WOOD :—*Colour* white, greyish-white, or grey. *An. rings* faintly marked. *Pores* moderate-sized and large, subdivided, and often in short radial section. *Med. rays* very fine, indistinct. Soft, spongy. *Wt.*—27 lbs. per c.ft.

USES :—Wood used for cylinders of native drums and sandals. The milk is acrid and produces vesication when applied to the skin.

See—Medicinal Plants.

SAPIUM SEBIFERUM Roxb.

FAM.—Euphorbiaceæ.

COM. NS. :—*E.* Tallow Tree ; *M.* Pipalyank.

CHAR. :—A moderate-sized handsome deciduous tree. *Bark* grey with shallow vertical cracks. *L.*—rhomboid, entire on long slender petioles. *Fl.*—in terminal spiciform racemes. Ovary glabrous. Styles 3, long, spreading, recurved. *Fr.*—capsule, coriaceous, subglobose, shortly pointed, seeds enclosed in a thick layer of white fatty substance (vegetable tallow), attached to a central column which splits into 3 slender divisions. *Fl. t.*—Junc. *Fr. t.*—ripe in Oct. Leaves turn scarlet or orange before falling.

DISTR. :—A native of China and Japan. Introduced and cultivated throughout N. India. Occasionally cultivated in gardens near Bombay.

DESCR. OF WOOD :—*Colour* white. *Pores* small to large, often subdivided. *Med. rays* very fine, numerous. The distance between the rays less than the transverse diameter of the pores. Numerous, very fine, wavy, oblique bars across the rays. Moderately hard. *Wt.*—32 lbs. per c.ft. (Dchra Dun).

USES :—The white-wax round the seeds gives the Chinese tallow. Seeds give an oil and leaves yield a black dye. Trees planted for ornament.

See—Oils, Dyes and Tans.

SARACA INDICA Linn.

FAM.—Cæsalpinaceæ.

COM. NS. :—*E.* Ashok Tree ; *G.* Ashopalava ; *H.* Asok ; *K.* Ashuge, Anthunala, Kenkali, Kusge ; *M.* Ashok, Jasundi.

CHAR. :—A handsome evergreen tree, 3·6-7·5 m. high or more ; girth ·6-·9 m. *Bark* dark coloured, rough with raised horizontal lines of lenticels ; inner bark thick, dark-red. *L.*—abruptly pinnate, sessile or nearly so, 30 cm., drooping, reddish when young ; leaflets opposite, 4-6 pairs, oblong-lanceolate, acute or obtuse, rigidly subcoriaceous, shining, 5-23 cm. long. *Fl.*—corymbs terminal and axillary, large, 7·5-10 cm. broad, crowded with flowers of beautiful orange colour ; pedicels coloured ; with coloured ovate bracts, Filaments 3 times as long as the sepals. *Fr.*—pod, 15-25 × 5 cm., hard, woody, dehiscent. Seeds 4-8, smooth, compressed, 4 cm. long. *Fl. t.*—Mar.-Apr. *Fr. t.*—Aug.-Sep.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara, rather common in Western Ghats in the Deccan and S. M. Country; Central and E. Himalayas, E. Bengal, W. Peninsula, Bengal: Ceylon, Malaya.

DESCR. OF WOOD :—*Colour* light reddish-brown, occasional faint brown concentric belts of soft tissue. *Pores* moderate-sized, in radial and frequently oblique lines. *Med. rays* fine, scanty, indistinct. Soft, light. *Wt.*—58 lbs. per c.ft.

USES :—Wood is not much used. Its flowers are much used in decorating temples. Bark used medicinally.

N.B.—This tree “The sorrow-less tree” or “Heart’s-ease” of the Mahabharat (Edwin Arnold) is one of the most important sacred trees in India, both among Hindoos and Buddhists.

See—Medicinal Plants, Sacred Plants.

SCHLEICHERA OLEOSA Merr.

(SCHLEICHERA TRIJUGA Willd.)

FAM.—Sapindaceæ.

COM. NS. :—*E.* Ceylon-oak, Gum-lac tree or Honey tree; G. Kossama; *H.* Gausam, Kosum, Kulimaya, Kukuli, Sagada, Shargodi; *M.* Kohan, Kusumb, Peduman; *Tr.* Kusum.

CHAR. :—A large beautiful deciduous tree with deeply furrowed trunk, sometimes 18-21 m. high, girth 2.4-3.6 m. *Bark* grey, exfoliating in small rounded plates of irregular shape and size. Young parts puberulous. *L.*—abruptly pinnate, 21-42 cm. at the ends of branches. Leaflets 4-8, 2.5-26 × 1.7-11 cm., opposite or sub-opposite, oblong, elliptic-oblong or nearly lanceolate, the lowest pairs the smallest, obtuse or shortly acuminate, entire, coriaceous, sessile. *Fl.*—small, yellowish-white or greenish on short pedicels, arranged in axillary, branched racemes. *Fr.*—2-2.5 cm. long, smooth, ovoid, unarmed or sometimes echinate. *Fl. t.*—Feb.-Mar. Sheds leaves in cold season; new leaves in Feb.-Mar.

DISTR. :—Common throughout India and the State in both dry and moist forests from the N. W. Himalaya to Madhya Bharat and South India: Ceylon, Burma.

DESCR. OF WOOD :—*Colour* sap-wood whitish; heart-wood light reddish-brown. *Pores* scanty moderate-sized, often oval and subdivided; often joined by pale, interrupted, wavy concentric lines. *Med. rays* very fine, very numerous, wavy, uniform and equidistant, closely packed; the distance between the rays less than the transverse diameter of the pores. One of hardest and heaviest of Indian woods, tough, durable, apt to develop surface cracks and requires slow seasoning; difficult to saw and work; takes a good polish. *Wt.*—68 lbs. per c.ft.

USES :—Wood used occasionally for beams and scantlings, carts, shafts, axles, naves and felloes of wheels, bolsters of timber-carts, tool-handles, tent-pegs, oil and sugar mills, rice-pounders, agricultural implements, turning; in mines as pit-props and galley-structures, tree used for the propagation of lac (this is supposed to be the best

quality lac). The pulpy sub-acid aril is eaten. Seed is the source of well known "Macassar" hair-oil. Bark contains about 9 per cent. of tannin. Bark, fruit and seeds used medicinally.

See—Oils, Medicinal Plants, Dyes and Tans.

SCHREBERA SWIETENIODES Roxb.

FAM.—Oleaceæ.

COM. NS.:—G. Ghant, Popti; II. Gantha, Ghant, Goki, Moka; K. Gante, Kalagante.

CHAR.:—A moderate-sized deciduous tree with erect trunk and numerous branches; 12-15 m. high; girth 1.2-1.5 m. Bark grey, thin, exfoliating in thin irregular scales. L.—about 30 cm. long, opposite or sub-opposite, in paripinnate leaflets, 3-4 pair with the odd one 7.5-10 cm., ovate-lanceolate, obtusely acuminate, unequal-sided at the base, opposite or sub-opposite, shining. Fl.—yellowish-white, turning brown, fragrant at night, arranged in terminal trichotomous, corymbose panicles, 7.5-15 cm. long. Calyx glabrous or rarely pubescent. Corolla 1.3 cm. long. Fr.—capsule 4.5 cm. woody, pyriform, rough, with white specks, bivalved. Fl. t.—Apr.-May. Fr. t.—ripe next cold or hot season. Leafless Jan.-Mar.; new leaves Apr.-May.

DISTR.:—Throughout the State in deciduous forests; common locally in N. Kanara, Konkan, Thal Ghat, Deccan, S. M. Country, Madhya Bharat, S. India, W. India, Kumaon: Burma.

DESCR. OF WOOD:—Colour brownish-grey; no definite heart-wood, but irregular masses of purple and claret coloured-wood in the centre, and scattered throughout the tree. Close-grained. An. rings indistinct. Pores small, often in small groups in radial arrangement. Med. rays fine, numerous, uniform and at equal distances, conspicuous as narrow plates in the silver-grain. Hard, durable. Wt.—57 lbs. per c.ft.

USES:—Wood used for dug-out canoes, beams of weaver's looms, ploughs, utensils, combs and for turning; sometimes used for buildings in Burma; a possible substitute for boxwood for engraving.

SCLEROPYRUM WALLICHIANUM Arn.

FAM.—Santalaceæ.

COM. NS.:—K. Bodlige, Benduga.

CHAR.:—A small tree armed with sharp conical, woody, often fascicled spines. Bark smooth, greyish-white. L.—coriaceous, red when young, 7.5-15 × 3.1-5.6 cm., ovate, elliptic or oblong, obtuse or sub-acute, glabrous. Fl.—polygamous, yellowish-red. Male in catkin-like spikes, axillary or above the scar of fallen leaves. Perianth tube solid, segments 5, with tufts of hair behind the 5 stamens. Female flowers in compact cylindric racemes. Perianth tube adnate to the ovary. Stigma large, peltate. Fr.—brown, pyriform, stalked, 3-5 cm. long, crowned by persistent perianth-segments, smooth. Fl. t.—Dec.-Mar. Fr. t.—Apr.-June.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara ghats ; near Yellapur, common near the Nilkund and Dodmane ghats. Western Peninsula : Ceylon.

DESCR. OF WOOD :—*Colour* whitish. *Med. rays* numerous, both fine and broad. Pith large, curiously grained.

USES :—Not available.

SCOLOPIA CRENATA Clos.

FAM.—Flacourtiaceæ.

COM. NS. :—K. Dodda Jepalu, Japle.

CHAR. :—A small tree, thorny when young. *Bark* smooth, rufous-grey. *L.*—5·2-15·8 × 2·6-5·2 cm., ovate or elliptic, oblong-lanceolate, obtusely or acutely acuminate, slightly attenuated at the base, glabrous and shining above, pale and reticulate beneath, obtusely crenated, teeth glandular. Racemes 2·6-7·8 cm., axillary, glabrous or puberulous. *Fl.*—nearly 1·34 cm. diam., on longish peduncles, which are furnished with 2-3 small deciduous bracts at the base. Sepals and petals 5-6 each, ciliate. *Fr.*—globose, size of a cherry, apiculate.

DISTR. :—Common in the "Sholas" of the Nilgiris, Mysore, Malabar ; in the forests of Western Ghats from Konkan southwards ; hills of Ceylon, China and the Philippines.

DESCR. OF WOOD :—*Colour* reddish brown. Close and even-grained. *Pores* small or moderate-sized, sub-divided or in short radial lines. *Med. rays* fine, very numerous, close, bent round the pores. Beddome says : "The wood is so hard as to resist the saw and injure tools, liable to warp."

USES :—Used for planking (Madras).

SECURINEGA LEUCOPYRUS M. Arg.

(FLUGGEA LEUCOPYRUS Willd.)

FAM.—Euphorbiaceæ.

COM. NS. :—H. Ainta, Hartho ; M. Pandharpali.

CHAR. :—A large rigid bush or a small tree, 3-4·5 m. high, girth about 30 cm. *Bark* grey or dark-brown, covered with small white lenticels ; branchlets angular, usually ending in sharp spines. *L.*—small rarely reaching 4 × 2·5 cm. obovate or obcordate. *Fl.*—as in *Securinega virosa* Pax F. & K. Hoff. *Fr.*—globose, about 6 cm. in diameter, smooth, quite white when ripe, 3-celled. *Fl. t.*—May. *Fr. t.*—July-Sept.

DISTR. :—Throughout the State, usually very common in open situations. Deccan Peninsula from N. Kanara southwards, Sind, Punjab, Burma, Ceylon.

DESCR. OF WOOD :—*Colour* pink. Close-grained. Hard.

USES :—Wood used for fuel. Fruits eaten.

See—Fruit Trees.

SECURINEGA VIROSA Pax. F. & K. Hoff.

FAM.—Euphorbiaceæ.

COM. NS. :—G. Shaunavi ; H. Dalma, Patala ; K. Belahuli, Bilisuli, Gudahale ; M. Kodarsi, Pandharpali.

CHAR. :—A large glabrous shrub or a very small tree. *Bark* grey with lenticular specks ; branchlets angular. *L.*—alternate, variable, thin, 2.5-7 × 1.3-2.5 cm., elliptic, rounded, obtuse. *Fl.*—yellowish, dioecious, in axillary clusters ; males numerous with filiform pedicels, stamens 3-5 ; females 1-5, styles 3, deeply divided into 2 linear segments. *Fr.*—globose of 2 kinds ; small with dry-pericarp, larger white with a fleshy pericarp, edible. *Fl. t.*—May-June. *Fr. t.*—rainy season.

DISTR. :—Throughout the State in deciduous forests ; common throughout India : China, Malay Islands, Australia, Tropical Africa.

DESCR. OF WOOD :—*Colour* red. Close-grained. *Pores* small, fairly numerous, in short radial lines. *Med. rays* fine, numerous, regular, the distance between the rays greater than the transverse diameter of the pores. Hard, strong, durable. *Wt.*—53 lbs. per c.ft.

USES :—Wood used for agricultural implements, frame-work of thatched roofs, walking sticks. Roots and leaves used medicinally. Bark used to intoxicate fish.

See—Medicinal Plants, Fish Poisons.

SEMECARPUS ANACARDIUM Linn.

FAM.—Anacardiaceæ.

COM. NS. :—E. Marking Nut tree ; G. Bhilamu ; H. Bhela, Bhilava, Bilaran ; K. Gerkayi, Keru ; M. Biba, Bibwa.

CHAR. :—A moderate-sized deciduous tree ; trunk erect, 9-12 m. high, girth about 1.2 m. *Bark* 1.3 cm., thick, dark brown, rough, exfoliating in very irregular inner patches ; inner bark fibrous ; dioecious ; young branches, inflorescence, petioles and the under side of leaves covered with a short, pale pubescence. *L.*—23-47 × 13-31 cm., approximated near the ends of branches, oblong or obovate-oblong, rarely linear-oblong, usually contracted below the middle, rounded at the top, rounded, cordate or cuneate at the base, thick coriaceous, on rounded, thick petiole ; nerves 16-25 pairs, conspicuous. *Fl.*—greenish-white or yellow, small, sub-sessile, fascicled, arranged in erect, large, terminal panicles as long as the leaves or shorter. Petals 3-4 times the length of the calyx, spreading, glabrous. Stamens 5, filaments slender ; ovary densely tomentose. Styles 3. *Fr.*—drupe, obliquely oval or oblong, smooth, shining, purplish black ; cup-shaped hypocarp, orange-red, fleshy and edible. *Fl. t.*—varies but generally in the hot season. *Fr. t.*—Nov.-Feb. Sheds leaves in Feb. ; new leaves in May.

DISTR. :—In deciduous dry forests throughout the State. Abundant in dry forests of Konkan, Deccan and Gujarat ; sub-Himalayan tract from the Beas eastwards ; Assam, Khasia hills, Chittagong, Madhya Bharat and W. Peninsula ; E. Archipelago. Australia.

DESCR. OF WOOD :—*Colour* greyish-brown, often with yellow streaks. No *an. rings*. *Pores* scanty, moderate-sized, frequently sub-divided, well-marked on a vertical section, sometimes joined by lines of soft tissue. *Med. rays* numerous, moderately broad, reddish; prominent in the silver-grain as long narrow dark-coloured plates. Soft, not durable. *Wt.*—37 lbs. per c.ft.

USES :—Wood used for oars. Good for matches and match-boxes. (It is not much used as timber-cutters object to felling due to irritation and swellings caused by acrid juice from the wood.) Gum from the bark, fruit pulp and oil used medicinally. Bark is employed in dyeing. Fleshy orange receptacles are eaten. Corrosive juice from pericarp used for marking cotton.

See—Medicinal Plants, Gums and Resins, Oils, Dyes and Tans.

SESBANIA GRANDIFLORA Pers.

FAM.—Papilionaceæ.

COM. NS. :—*G.* Agathio; *H.* Augusta, Bak, Basna, Hatiya; *K.* Agase, Kempagase; *M.* Agasta, Agati, Hadga.

CHAR. :—A short lived tree, 6-9 m. high, girth 3-6 m. *Bark* light brown, smooth. *L.*—15-31 cm. long, abruptly pinnate. Leaflets 40-60, 2.5-4 cm. long, opposite, linear-oblong, obtuse, and often mucronate, entire, membranous, glabrous, pale-green, on short petiolules. *Fl.*—white or red, in short axillary racemes. *Calyx* 2.5 cm. long, glabrous. *Corolla* 7-10 cm. long. *Fr.*—pod 31 cm. or more, about 3 lin. broad, not torulose. Flowering and fruiting at all seasons of the year.

DISTR. :—Grown about temples and villages all over the State, and in many parts of India: indigenous from Malaya to N. Australia.

DESCR. OF WOOD :—*Colour* white. *Pores* small and moderate-sized, often in radial groups of 3 to 5 between the numerous, fine, white *med. rays*. Soft, not durable. *Wt.*—32 lbs. per c.ft.

USES :—Wood used for fuel; and for posts of houses in Bengal; grown as support for betel-vines. Tender leaves, flowers and pods are eaten as vegetables.

See—Food Plants.

SESBANIA SESBAN Merr.

(*SESBANIA ÆGYPTIACA* Pers.)

FAM.—Papilionaceæ.

COM. NS. :—*G.* Raysingani; *H.* Janjhan, Jayanti, Rasin; *K.* Jayanti, Jinangi; *M.* Shewari.

CHAR. :—A small evergreen tree, 4.5-6 m. high, girth 3-9 m. *Bark* brown, nearly glabrous. *L.*—7.5-15 cm., abruptly pinnate. Leaflets 20-40, 2-2.5 cm. long, linear-oblong, obtuse, with or without a mucro, entire, membranous, pale-green. *Fl.*—yellow, spotted with purple, 6-10 on spreading slender pedicels forming lax axillary drooping racemes. *Calyx* membranous. *Corolla* 7.2 cm. *Fr.*—pod, 15-23 × 2-2.5 lin., torulose, pointed. Seeds 20-30, pale-brown. *Fl. t.*—end of rainy and during cold season.

DISTR. :—Rare along nalas and water-courses in N. Kanara; commonly planted in gardens throughout the State as support to betel-vines and as a substitute for bamboos in the drier parts of the Deccan. Plains from the Himalayas to Siam and Ceylon. Throughout the Tropics of the Old-World.

DESCR. OF WOOD :—*Colour* white. *Pores* small, scanty, single or sub-divided or in radial groups, between the very fine and very numerous *med. rays*, the distance between which is less than the transverse diameter of the pores. Extremely soft. *Wt.*—27 lbs. per c.ft.

USES :—Wood used for charcoal, best for gunpowder; good for toys. Timber cultivated to furnish poles in place of bamboos, and as shade and support to betel-vines. Rope is made from the bark. Leaves and young branches good fodder for cattle. It would be useful as a nurse in forest-plantation.

See—Fibres, Fodder Plants.

SONNERATIA ACIDA Linn.

FAM.—Sonneratiaceæ.

COM. NS. :—K. Chipi; M. Tiwar.

CHAR. :—A large glabrous evergreen shrub or a small tree, 3-4.5 m. high; branches drooping. *L.*—7.5-10 × 2.4-5 cm., obovate or broadly-ovate, attenuated into a broad but very short petiole, obtuse or retuse, entire, coriaceous. *Fl.*—about 5 cm. diam., reddish or purplish, on very short peduncles, solitary at the ends of branchlets. Calyx about 2.5 cm., not ribbed, 6-8-lobed. Petals linear, acute. Style long-exserted. *Fr.*—capsule, 5-6.6 cm. broad, concave at the top, many-celled. *Fl. t.*—Mar.-July. *Fr. t.*—Oct.-Nov.

DISTR. :—In the salt marshes and the creeks of the Konkan and N. Kanara, coasts of India, Burma, Andamans, Ceylon, Java, Siam, Sind.

DESCR. OF WOOD :—*Colour* grey. Even-grained. *Pores* small, oval and sub-divided, very numerous, uniformly distributed. *Med. rays* very fine, very numerous, bent round the pores. Soft, light. *Wt.*—36 lbs. per c.ft.

USES :—Wood used for models; used as a substitute for coal in steamers in Ceylon. Roots (pneumatophores) are sometimes used as a substitute for cork; they are cut into slices and are used for Entomologist's boxes.

SONNERATIA APETALA Ham.

FAM.—Sonneratiaceæ.

COM. NS. :—M. Tiwar.

CHAR. :—A moderate-sized evergreen tree, 12-15 m. high; girth. 9-1.5 m. (in some places it is a stunted shrub). *Bark* black, smooth, shining, with horizontal oval lenticels; branches drooping. *L.*—7.5-10 × 2.5-4 cm., oblong-lanceolate, or linear-lanceolate, obtuse,

attenuated at the base, coriaceous, pale-green. *Fl.*—whitish, about 2.5 cm. diam. Pedicel 2.5 cm., terete or angular, arising from the ends of branchlets. Calyx lobes 4, oblong, acute. Petals none. Stamens-filaments as long as the calyx-lobes. Gynœceum (4-15) style included or scarcely exsert; stigma large, capitate. *Fr.*—capsule, broader than high, 4-6-celled with the calyx at the base. *Fl. t.*—Mar.-June. *Fr. t.*—Aug.-Oct.

DISTR. :—Salt marshes in Konkan districts. Tidal creeks of Bengal and Western Peninsula. Burma.

DESCR. OF WOOD :—*Colour* sap-wood grey; heart-wood reddish-brown. *Pores* small, numerous, oval and sub-divided, in two to three sections. *Med. rays* fine, very numerous, bent round the pores, Moderately hard, strong. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for house-building, packing cases, rough-furniture, and boat-building; also as fuel.

SOYMIDA FEBRIFUGA A. Juss.

FAM.—Meliaceæ.

COM. NS. :—*E.* Bastard cedar, Indian Redwood; *H.* Rohan; *K.* Some or Swami-mara, Sumbri; *M.* Lal-chandan, Palara, Rohan.

CHAR. :—A large deciduous tree, 21-24 m. high, girth 2.1-2.4 m. *Bark* bluish-grey or dark-brown, rough, exfoliating in large plates or scales. *L.*—abruptly pinnate, 23-47 cm. long. Leaflets 6-12, 4.13 × 2.7 cm., opposite, elliptic or oblong, obtuse at the apex, oblique at the base, on very short petiolules. *Fl.*—greenish-white on short pedicels forming large panicles often equalling the leaves. Calyx deeply 5-cleft. Petals 5, obovate, contorted in bud. Bracts ovate deltoid, small. *Fr.*—capsule, oblong, obovoid, smooth, black when ripe, size of an apple. *Fl. t.*—Apr.-May. *Fr. t.*—July-Aug. New leaves appear in hot season while part of old leaves are still on the tree.

DISTR. :—Usually on dry stony hills in Gujarat, Khandesh, Belgaum and Dharwar, Madras State, Madhya Bharat; Ceylon.

DESCR. OF WOOD :—Sap-wood small, whitish; heart-wood extremely hard and close-grained, very dark red-brown, very durable, with numerous fine, concentric lines of lighter colour, often closely packed. *Pores* moderate-sized, scanty. *Med. rays* moderately broad, distinctly visible on a radial section as dark shining plates, making with the sections of dark pores, a very pretty silver-grain having a satiny lustre, cross-grained. Handsome and takes a good polish. *Wt.*—74 lbs. per c.ft.

USES :—Wood used for building, furniture, oil-mills, cattle-troughs, carving and turning, might be suitable for paving blocks. Yields a transparent gum, like gum arabic from the wounds in the trunk, which affords good mucilage. Bark is used for tanning giving brown colour; it also gives a strong red rope-fibre; it is also used medicinally as a febrifuge.

See—Dyes and Tans, Fibres, Gums and Resins, Medicinal Plants.

SPATHODEA COMPANULATA Beauv.

FAM.—Bignoniaceæ.

COM. NS. :—*E.* Fountain Tree ; *M.* Karanj Vriksha. (The flower bud when punctured at the apex and pressed gives out a jet of water like a fountain, hence the name).

CHAR. :—A middle-sized tree, stem slender, 6-9 m. high, even more. *Bark* light grey, fibrous ; having a few short branches, bearing a crown of large pinnate leaves, 3-45 m. long, leaflets 9-19, short stalked, ovate-lanceolate, entire at the base with 2 or 3 fleshy glands, 5-10 cm. long. *Fl.*—in many-fid racemes, scarlet. Calyx boat-shaped, recurved, 6.3 cm. long. Corolla bell-shaped about 10 cm. long, with ovate, plicate and somewhat undulate lobes. *Fr.*—capsule, about 20 cm. long. *Fl. t.*—Sept.-Nov.

DISTR. :—Cultivated in gardens or in avenues in the State both in wet and dry districts. (The climate of Bombay seems to suit and it may be seen in full flower in November in the Victoria Gardens and some new avenues at Matunga). Cultivated in gardens in Madras and Calcutta.

DESCR. OF WOOD :—*Colour* yellowish white, close-grained. *Pores* moderate-sized, often sub-divided, rather scanty, irregularly distributed but usually in more or less easily recognised slanting lines. *Med. rays* few ; short, narrow, white. Hard, smooth. *Wt.*—40 lbs. per c.ft. (Madras).

USES :—Not known.

SPONDIAS MANGIFERA Pers.

FAM.—Anacardiaceæ.

COM. NS. :—*E.* Bile Tree, Indian Hog-plum ; *H.* Amara, Ambokha ; *K.* Amate, Avatekayi ; *M.* Ambada, Ran-amba.

CHAR. :—A moderate-sized deciduous tree, about 6 m. high, and 1.2 m. in girth (in favourable conditions it grows to the height of 15-18 m. or more). *Bark* smooth, grey, thick, with short, shallow, longitudinal wrinkles. *L.*—alternate, 31-47 cm. long, imparipinnate, on slender terete petioles. Leaflets 9-13, 5.23 × 2.5-10 cm., opposite, elliptic-oblong, acuminate, more or less oblique at the base, quite entire, glabrous, membranous, shining, shortly petiolulate ; nerves 10-30 pairs, horizontal, prominent, joined by a conspicuous intramarginal one. *Fl.*—small, scattered, greenish-white, uni- or bisexual, sub-sessile, arranged on large, terminal, much-branched panicles. Calyx 5-toothed. Petals 5, oblong. Disc large, fleshy, 10-crenate. Stamens 10, filaments subulate. *Fr.*—drupe, 1.3-5 cm. long, ovoid, smooth, yellow ; stone woody, tough and rough, with small cavities, usually with 1-3 perfect seeds. *Fl. t.*—Feb.-Apr. *Fr. t.*—ripe in cold season Nov.-Dec. Sheds leaves early in the year. Flowers appear when the trees are quite bare ; very conspicuous at this stage.

DISTR. :—Throughout the State, usually in dry deciduous forests, common in N. Kanara from the sea-coast inland. Konkan, Gujarat,

S. M. Country, widely planted; Sub-Himalayan tract and outer valleys from the Chenab eastwards; Salt Range, W. Peninsula; Burma, Andamans, Ceylon, Indian Archipelago, Cocos Islands.

DESCR. OF WOOD :—*Colour* light-grey. *Coarse-grained*. *Pores* large, numerous, often sub-divided. *Med. rays* fine and moderately broad, at unequal distances, white, prominent, distinctly marked as long narrow plates in the silver-grain. *Soft*. *Wt.*—about 26 lbs. per c.ft.

USES :—Wood is useless. It gives from the bark wounds an insipid gum somewhat resembling gum-arabic, but darker. Fruit is eaten, more usually pickled or made into curries. Leaves and fruits used medicinally. Bark used for tanning.

See—Medicinal Plants, Gums and Resins, Dyes and Tans, Fruit Trees.

STERCULIA FOETIDA Linn.

FAM.—Sterculiaceæ.

COM. NS. :—*E.* Bastard-Poon; *H.* Gangh-badam; *K.* Penari, Sembadi; *M.* Goldaru, Nagalkuda.

CHAR. :—A large deciduous straight, stout, handsome, stately tree; branches horizontal, verticillate; 24-27 m. high, girth 2.4-3 m. Glabrous except the very young leaves and shoots. *Bark* thick, whitish. *L.*—crowded at the ends of the thick branchlets on petioles, 20.8 cm., digitately 5-9 (11)-foliolate; leaflets about 15.6 × 5.2 cm., elliptic-oblong or lanceolate, acuminate or cuspidate, entire, shortly petioluled, coriaceous. *Fl.*—polygamous, of a dull crimson colour, rather large, emitting a strong disagreeable smell, in lax, simple or branched racemes, about as long as the petioles; pedicels shorter than the flower, jointed in the middle. Bracteoles minute. Calyx 1.3-2.6 cm. diam., campanulate, deeply 5-cleft, glabrous externally and hairy internally, lobes lanceolate, spreading. Petals none. Staminal column bearing several (12-15) sessile, 2-celled anthers. Carpels 5, villous. Style stalked, curved. *Fr.*—Follicle about 2.4 by 2½ in., glabrous, woody, boat-shaped shortly beaked. Seeds 10-15, large, oblong, black, smooth. *Fl. t.*—Mar.-May. *Fr. t.*—beginning of rainy season. Sheds leaves in hot season.

DISTR. :—Common in Bombay, generally cultivated; found sparingly in wild state, throughout Bombay, Madras and Bengal States; Ceylon and Burma.

DESCR. OF WOOD :—*Colour* grey. *Pores* moderate-sized, often sub-divided. *Med. rays* broad, short, pale, joined by numerous transverse bars, loose grained. *Soft*, light, spongy, works easily; takes indifferent polish; warps and splits. *Wt.*—28 lbs. per c.ft.

USES :—Inferior buildings, dug-out canoes, masts, and rough packing cases; seeds edible; exudes gum resembling tragacanth; liber yields fibre.

See—Fibres, Gums and Resins, Food Plants.

STERCULIA GUTTATA Roxb.

FAM.—Sterculiaceæ.

COM. NS. :—K. Happu, Savage ; M. Golder, Kukar.

CHAR. :—A large or middle-sized erect tree. Young shoots pubescent. *Bark* ash-coloured, cracked. *L.*—18·2-20·8 × 10·4-13 cm., smooth, shining or scabrid above, very softly villous beneath, oblong-ovate, acute or suddenly acuminate, rounded or slightly cordate at the base, entire ; petiole round, downy, 5·2-10·4 cm. Bracts lanceolate. *Fl.*—chiefly hermaphrodite, usually in threes on pedicels shorter than flowers, in terminal and axillary, villous racemes. Calyx 5-fid, segments broadly ovate-acute, reflexed, densely villous on both sides, of a pale-yellow colour externally, internally of the same colour spotted with purple. Corolla none. Anthers 12. Ovary long-stalked, 3-5-lobed, downy. Style curved ; stigma 3-5-lobed. *Fr.*—follicle, 1-5, usually 5, each about 7·8 × 5·2 cm., obovoid, villous, of a brilliant red colour. Seeds large, oblong, black. *Fl. t.*—Feb. *Fr. t.*—hot season. Leafless in Feb. Looks very ornamental when covered with red follicles.

DISTR. :—Throughout the forests of the Konkan and N. Kanara usually near moist evergreens : Malabar, Nilgiris, Madras : Ceylon, Andaman Islands and Malacca.

DESCR. OF WOOD :—*Colour* greyish-white. *Pores* very large, scanty, ringed. *Med. rays* broad, not numerous, giving a good silver-grain. Transverse bars spaced, not very prominent. Soft, light and porous.

USES :—Wood uscless. Bark yields a strong fibre adapted for cordage and the manufacture of paper. Cloth is manufactured from them in Malabar. Seeds are roasted and eaten.

See—Fibres, Food Plants.

STERCULIA URENS Roxb.

FAM.—Sterculiaceæ.

COM. NS. :—G. Kada, Karai, Kalauri ; H. Gulu, Gular, Karrai, Tabai, Tanuku ; K. Chauri, Chevoli, Kempudole, Savaya ; M. Kandol, Karai, Kurku, Sarda, Saladhor.

CHAR. :—A large deciduous tree, trunk erect, branches spreading, height 18-21 m., girth 2·4-3 m. *Bark* 1·34 cm., thick, very smooth, white or greenish-grey, exfoliating in large thin irregular paper flakes. *L.*—crowded at the ends of branches, 23·4-31·2 cm., long and broad, cordate at the base, usually 5-lobed ; lobes entire, acuminate, membranous or somewhat coriaceous, tomentose beneath, nearly glabrous above ; petioles 15·6-23·4 cm. *Fl.*—small, numerous, greenish-yellow, covered with a glutinous yellow tomentum ; male and female mixed in much-branched panicles ; pedicels furnished at their bases with linear bracts, deciduous after flowering. Calyx campanulate, 5-toothed. Corolla none. Filaments 10, alternately longer, united below into a thin sheath which encloses the base of the gynophore. Anthers large, alternately larger. Ovary supported on a thick gynophore. Style short and thick ; stigma 5-lobed.

Fr.—of 5 radiating carpels 7·8 cm. long, orange to bright red, covered with dense tomentum, intermixed with stinging hairs. Seeds 3-6, oblong, black or chestnut coloured. *Fl. t.*—Dec.-Mar. *Fr. t.*—Apr.-May. Leafless in cold season; young leaves in hot season.

DISTR. :—Common near the coast on rocky soils in the Konkan and N. Kanara. Dry deciduous forest of Deccan districts. (Khandesh Satpudas). Sub-Himalayan tract from the Ganges eastwards in dry deciduous forests throughout the Peninsula; hills of Rajasthan, Madhya Bharat, Bihar. Dry forests of Burma.

DESCR. OF WOOD :—*Colour* reddish-brown, with an unpleasant smell; feels wet or oily. *Pores* large, often oval and sub-divided, very scanty, frequently filled with gum. *Med. rays* moderately broad, on a radial section prominent as long, dark, undulating bands, giving the wood a mottled silver-grain; the distance between the rays is larger than the transverse diameter of pores. Alternate dark and light concentric bands across the rays. Very soft. *Wt.*—40 lbs. per c.ft.

USES :—Wood used for doors of huts, dug-out canoes, boat-planking, native guitars, toys, models, platters, etc.; white gum (Katira gum) exuding from the bark used medicinally as a substitute for gum tragacanth. Seeds are roasted and eaten by the Gonds in Madhya Bharat.

See—Gums and Resins, Food Plants.

STERCULIA VILLOSA Roxb.

FAM.—Sterculiaceæ.

COM. NS. :—*H.* Odela, Udal, Udar; *K.* Kaithali, Kalsoga, Pulikisouge, Sage, Savaya, Samikai; *M.* Kuthada, Sarda.

CHAR. :—A moderate-sized deciduous tree; branches few, spreading; attains height 18-21 m. and girth 1·2 × 1·8 m. in S. India, towards the north only as a shrub 2·4-3 m. high. *Bark* grey or brown with corky warts. Younger parts tomentose. *L.*—3·4 m. each way, crowded at the ends of branches, deeply palmately 5-7 lobed, cordate at the base, 5-7-nerved; lobes oblong, acute or acuminate, sometimes 3-fid, nearly glabrous or thinly stellate-pilose above, tomentose beneath; petioles puberulous, as long as the leaf, enlarged at the tip; stipules oblong, acuminate. *Fl.*—numerous, male and female mixed, yellow, sometimes with pink or orange eye, on slender pubescent pedicels, nearly as long as the calyx, arranged in lax, drooping panicles, about 3·35 m., tawny-pubescent, at the ends of the leafless branches. Bracts linear, caducous. Calyx 1·34 cm. diam.; membranous, campanulate, deeply 5-cleft, lobes spreading, puberulous externally. Corolla none. Anthers 10, on the top of the staminal column. Ovary globose, puberulous on a gynophore as long as the calyx. Style curved. *Fr.*—consisting of 5 coriaceous, oblong, rusty densely tomentose follicles, about 4·7-8 cm., almost sessile. Seeds oblong, black, several in each carpel. *Fl. t.*—Mar.-Apr. *Fr. t.*—June-July. Leafless in cold season; new leaves in Mar. and Apr.

DISTR. :—Gujarat to S. Konkan ; Sub-Himalayan tract from the Indus eastwards, common in forests throughout India : Burma, Andamans and Cocos Islands.

DESCR. OF WOOD :—*Colour* greyish-brown. *Pores* large, scanty, often sub-divided. *An. rings* prominent. *Med. rays* harder than the spongy tissue between them, short, giving a marked silver-grain on a radial section on which, also, the pores are distinctly prominent. Very soft, spongy and light. *Wt.*—19 lbs. per c.ft.

USES :—Wood used for tea-boxes. Bark used for elephant timber-dragging ropes, also for sacks in S. India. A pellucid gum exuded from the bark sold as a substitute for gum tragacanth. A good kind of paper is said to have been made from the fibre.

See—Fibres, Gums and Resins.

STEREOSPERMUM CHELONOIDES DC.

FAM.—Bignoniaceæ.

COM. NS. :—*H.* Podal, Pader, Padri, Para ; *K.* Kall-udi, Mallalli, Mukarti, Padiri, Puruli ; *M.* Padal, Paral, Patal.

CHAR. :—A large deciduous tree, with many spreading branches, 12-18 m. high ; girth 1.2-1.5 m. *Bark* brown, varying in thickness upto 1.3 cm., outer bark corky. *L.*—30-45 cm., opposite, imparipinnate, leaflets 3-5 pairs, 10-15 × 5 cm., oval-elliptic, long-acuminate, entire or sometimes slightly serrate, short-petioled. *Fl.*—1.3-2.5 cm., yellow, fragrant, on glabrous pedicels, borne on large terminal lax panicles. Calyx 5-toothed. Corolla bilabiate, lobes curled, rugose. *Fr.*—capsule, 30-60 × 1.3 cm., compressed, curved. Seeds with membranous pellucid wings. *Fl. t.*—Apr.-July. *Fr. t.*—Aug.-Jan., the fruit remains long on the tree. Leaves shed Feb.-Mar. ; new leaves in Apr.

DISTR. :—Throughout the Konkan and N. Kanara in evergreen forests ; also in deciduous moist forests, from the Terai of Oudh and Assam to Ceylon and Pegu.

DESCR. OF WOOD :—*Colour* grey. No heart-wood. *Pores* moderate-sized and large, joined by narrow, irregular, wavy, interrupted belts and lines of soft tissue. Pores frequently filled with a white substance of a resinous nature, which is prominent on a vertical section. *Med. rays* short, wavy, moderately broad, numerous, prominent on a radial section as long, narrow, horizontal bands. Hard, moderately durable, elastic, easy to work. *Wt.*—47 lbs. per c.ft.

USES :—Wood used for house-building, furniture, tea-boxes, cart shafts, agricultural implements, dug-out canoes, oars. Root, bark, leaves, flowers and fruits used in medicine.

STEREOSPERMUM PERSONATUM Chatterjee.

(STEREOSPERMUM SAUVEOLENS DC.)

FAM.—Bignoniaceæ.

COM. NS. :—*H.* Podal, Podiala, Pandri, Parur ; *K.* Giri-hadari, Hude, Hulave, Kariguddada ; *M.* Padal, Pahad, Parul, Patala.

CHAR. :—A large deciduous tree, 9-18 m. high; girth .9-1.8 m. Young parts viscous hairy. *Bark* grey, exfoliating in large irregularly shaped, flat scales. *L.*—3.6 m., opposite, imparipinnate; leaflets 2-4 pairs, 7.5-15 × 6.3-8 cm., petioled, ovate or elliptic ovate, acuminate, almost entire or slightly serrate, downy when young, glabrous when old; petiole enlarged at the base. *Fl.*—4 cm. long, of a dark, dull, crimson colour, fragrant, glandular, puberulous, on slender pedicels, forming a large trichotomous viscid panicle. Calyx 4-cleft. Corolla campanulate, bilabiate. Calyx-lobes curled. *Fr.*—capsule, .45-.6 m. × 7.5-10 cm. diam., dark-grey, rough with elevated white tubercles. Seeds with membranous pellucid wings. *Fl. t.*—Mar.-Apr. *Fr. t.*—Nov.-Dec. Leafless in Apr., new leaves in May.

DISTR. :—Monsoon-forests. In the deciduous forests of Bombay State; common in Dharwar and in N. Kanara. Throughout moister India from sub-Himalaya (Terai) to Travancore and Tenasserim: Ceylon.

DESCR. OF WOOD :—*Colour* sap-wood grey; heart-wood small, yellowish-brown, beautifully mottled with darker streaks. *Pores* moderate-sized, enclosed in patches of loose texture which are more or less concentrically arranged and sometimes run together entirely into concentric belts. The pores are frequently filled with a white shining substance, which becomes yellow in the heart-wood. *Med. rays* fine, sharply defined, numerous, wavy, equidistant, prominent on the radial section. Very hard; seasons and polishes well; durable, easy to work. *Wt.*—46 lbs. per c.ft.

USES :—Wood used for building purposes; is an excellent fire-wood and makes a good charcoal. Root-bark, flowers and fruits are used in medicine. Leaves are eaten by buffaloes.

See—Medicinal Plants, Fodder Plants.

STEREOSPERMUM XYLOCARPUM Benth.

FAM.—Bignoniaceæ.

COM. NS. :—*H.* Bairsing; *K.* Ghansing, Hooday; *M.* Kadashing, Kharsing.

CHAR. :—A middle-sized deciduous tree, 9-10.5 m. or more high. *Bark* light-grey. *L.*—3-1.2 m., glabrous, bi-tri-pinnate, pinnæ 4-6 pairs; leaflets 5-12.5 × 2.5-3.1 cm., 3-5 pairs, short-petioled, ovate or ovate-lanceolate, oblong-acuminate, entire, membranaceous, reticulately veined. *Fl.*—large, white slightly yellow, fragrant, in large terminal corymbose cymes. Calyx campanulate, coloured unequally, 5-toothed. Corolla 5 cm. long. *Fr.*—curved, hard, woody, and very rough, with hard tubercles, inside smooth. Seeds numerous, winged. *Fl. t.*—Apr.-May. *Fr. t.*—next Apr.-May. Leafless during the cold months; new foliage in hot weather.

DISTR. :—Konkan hills, Deccan, Dang jungles, Khandesh; Belgaum, common in the dry forests of Dharwar district. Western

Peninsula extending north to the Satpudas. Madhya Pradesh. Common in Wynaad and Travancore.

DESCR. OF WOOD :—*Colour* sap-wood large; grey; heart-wood very hard, orange-brown. Close-grained. *An. rings* marked by an irregular belt of numerous pores. *Pores* small and moderate-sized, often sub-divided, each pore or a group of pores in a small patch of soft tissue; these patches are frequently grouped in zigzag and more or less concentric lines. In the heart-wood the pores are generally filled with a yellow substance. *Med. rays* short, fine. Good, handsome, tough, elastic; takes a good polish. *Wt.*—44 lbs. per c.ft.

USES :—Wood used for cabinet work, turnery, cart-shafts, and poles. It deserves to be better known and to be in more general use. Yellow resinous substance from the heart-wood is employed in cutaneous diseases. Roxburgh says that the capsule would make a “dangerous bludgeon”.

STREBLUS ASPER Lour.

FAM.—Moraceæ.

COM. NS. :—*H. Dabia*, Kurchanna, Rusa, Sahora, Sihaura; *K. Mitlia*, Mittelgidda, Punje, *M. Karvati*, Kharota, Paraya, Poi.

CHAR. :—A small evergreen tree, 7·5-10·5 m. high, girth ·9-1·2 m. (sometimes more). Generally a small scraggy-looking tree. *Bark* grey, soft, irregularly ribbed. All parts harshly hoary. *L.*—3-10 × 2·5-5 cm., elliptic, rhomboid, oblong or obovate, obtuse or shortly acuminate, irregularly dentate, rough on both sides with minute raised dots. *Male fl.*—in short, pedunculate, globose axillary heads. *Female* axillary, 1-2 together on slender longer peduncles. *Fr.*—drupe, size of a pea, 1-seeded, yellow, partly enclosed in the enlarged perianth which is also yellow. *Fl. t.*—Jan.-Mar. *Fr. t.*—Apr.-May.

DISTR. :—Throughout the State in dry open forests; common; also found in the evergreen forests of N. Kanara. Throughout the drier parts of India, from Rohilkhand eastwards to Bengal, and southwards to Travancore; Ceylon.

DESCR. OF WOOD :—*Colour* white; no heart-wood, no *an. rings*. *Pores* small in irregular concentric belts of soft tissue, which contain the greater number of the pores and alternate with broader belts of firm tissue in which a few pores are scattered. *Med. rays* fine to moderately broad, not very numerous, equidistant. Moderately hard, tough, elastic; rather difficult to cut, blunting the axes. *Wt.*—40 lbs. per c.ft.

USES :—Wood is chiefly used for yokes; sometimes used for cart-wheels in S. India. Wood sap is used as a rennet to curdle milk. Bark is used for paper-making in Siam and the twigs as tooth-brushes. Rough leaves are used to polish wood and ivory. Fruit is edible; sap is used in medicine. Tree gives fairly good fuel.

See—Fruit Trees.

STROMBOSIA CEYLONICA Gardn.

FAM.—Olapaceæ.

COM. NS. :—No common names.

CHAR. :—A medium-sized or large evergreen tree. This tree sometimes attains a considerable height. (One tree near Sonda in N. Kanara 30 m. high with about 1 m. diam.). Branches pendulous. Bark smooth, white or grey, scaly; inner bark brown, fibrous. *L.*—15.5 × 6 cm., ovate, oblong-lanceolate, acute or acuminate at the apex, rounded at the base, entire, glabrous, pale beneath, coriaceous. *Fl.*—small, green, sub-sessile, in axillary glomerules or on a prominent tubercle. Calyx 5-fid; segments semi-orbicular. Petals 5, three times longer than calyx-lobes, linear-acute. Stamens 5, filaments opposite and adnate to petals. Ovary 4-5-celled. *Fr.*—pyriform, nearly 2.5 cm. long, rugose or tuberculated, purple, covered with scurfy scales. *Fl. t.*—Dec. *Fr. t.*—hot season.

DISTR. :—Endemic on the Konkan and N. Kanara ghats in evergreen forests. Evergreen forests of the Western ghats from the Konkan southwards: Goa, Ceylon. Alt. 900 m. Talbot distinguishes the Kanara form as a new species *S. leprosa* Talb.

DESCR. OF WOOD :—Colour reddish. Close-grained. Pores very small, single or in lines between the very fine, close med. rays, the diameter of the pores equalling the distance between the rays. An. rings distinct. Hard, smooth, durable. *Wt.*—60 lbs. per c.ft.

USES :—Not known.

STRYCHNOS NUX-VOMICA Linn.

FAM.—Loganiaceæ.

COM. NS. :—*E.* Crow-Fig, Kachita, Nux-Vomica or Strychnin tree, Poison Nut; *G.* Kuchla; *H.* Kajra, Kuchala, Nirmal; *K.* Hemushti, Imangi, Kajavara, Kasarakana; *M.* Kajra, Kuchla.

CHAR. :—A large deciduous tree, often with short sharp strong axillary spines, 12-15 m. high (sometimes reaching 30 m.); girth 9.1-2 m. Bark thin, grey, smooth or rough with lenticels. *L.*—7.5-10 × 5-8 cm., ovate or nearly orbicular, acute at the apex or quite rounded, coriaceous, shining above and glaucous beneath, prominently 3-5-nerved. *Fl.*—greenish-white on terminal, pubescent, trichotomous corymbose cymes. Corolla-tube cylindric. Ovary with numerous ovules. Stigma peltate. *Fr.*—berry, globular, size and colour of an orange. Seeds numerous, about 1.3 cm. long, flat, shining, circular or reniform. *Fl. t.*—Mar.-Apr. *Fr. t.*—ripe at various times throughout the year. Sheds leaves for a short while in hot season, new foliage almost simultaneously. Flowers have a strong odour of turmeric.

DISTR. :—Moist monsoon forests, very common in Konkan and N. Kanara; abundant on laterite along sea-coast. More or less throughout Tropical India including N. Circars, Karnatak, West Coast of Madras State, Travancore: Ceylon, Indo-China, Laos.

DESCR. OF WOOD :—Practically the same as *Strychnos potatorum*.

USES :—Wood used for inferior buildings, ploughs, cart-wheels, bedsteads, and fancy cabinet work. The seeds, which are flat and grey, yield the well-known alkaloids Strychnin and Brucin, of which large quantities are exported to Europe from Madras, Travancore and other parts of W. Peninsula. Seeds also yield oil and dye. Wood (rarely), leaves, fruit and seed are used medicinally.

See—Medicinal Plants, Poisonous Plants, Oils, Dyes and Tans.

STRYCHNOS POTATORUM Linn.

FAM.—Loganiaceæ.

COM. NS. :—E. The Clearing-nut tree ; K. Chili-gidda ; M. Nivali, Nirmali.

CHAR. :—A moderate-sized, evergreen, glabrous tree, 9-12 m. high ; girth 9-12 m. ; trunk often irregularly fluted. Bark thick, black, corky, scaly, cracked. L.—5-7.5 × 3-1.5 cm., ovate or rotundate, acute or obtuse, coriaceous, sub-sessile. Fl.—yellowish-white, odorless, small, in short pedunculate cymes rising solitary or in pairs from the scars of the fallen leaves. Corolla-tube campanulate ; segments rotate with tufts of white hairs at the base. Fr.—berry, 2-2.5 cm. diam., globose, black when ripe, 1-seeded. Seeds compressed, orbicular, embedded in purplish pulp. Fl. t.—Apr.-May. Fr. t.—cold season.

DISTR. :—In the Southern Maratha Country in the Belgaum district and in other parts of the State in dry forests. Southern India, Bengal, Madhya Pradesh.

DESCR. OF WOOD :—Colour white when fresh cut, turning yellowish-grey on exposure. Close-grained ; no heart-wood. Pores of two classes. Large pores very scanty ; those that are prominent on a radial section are filled with white, shining pith-tissue and are often ramified. Very small pores numerous, arranged in irregularly ramified patches, which are extremely variable in shape, giving the wood a remarkably fantastic pattern on cross-section. These patches are joined by white concentric lines which may possibly represent an. rings. Med. rays white, fine and moderately broad, numerous, sharply defined in the darker tissue. Hard, durable, seasons well ; takes fine polish. Wt.—58 lbs. per c.ft.

USES :—Wood used for buildings, plough-shares, cart-shafts and wheels. Pulp of the fruit is eaten. Seeds are used to clean muddy water ; they are devoid of poisonous properties and are used medicinally.

SWIETENIA MAHAGONY Linn.

FAM.—Meliaceæ.

COM. NS. :—E. The Mahogany tree ; M. Mahogany.

CHAR. :—A large evergreen tree, with abruptly pinnate leaves ; very glabrous, leaflets opposite, 6-10, obliquely-ovate, acuminate.

Fl.—small in axillary or sub-terminal panicles, greenish-yellow. Calyx small 5-cleft; petals 5, spreading; staminal tube urn-shaped, 10-toothed. *Fr.*—capsule, 5-celled about 7·5 cm. in diameter.

DISTR. :—It is a native of Central America and West Indies. It was introduced at Dapuri, Hewra, (Poona district), Calcutta, Sikkim to Saharanpur and grows well. Mr. Woodrow, Superintendent, Botanical Gardens, Ganeshkhind, says, "I have measured many mahogany trees. I find the average of eight years' growth is 20 ft. high and 15 inches circumference at 3 feet from the ground. Much larger trees, forty years old, are at Hewra." Much cultivated in India in gardens, avenues and forest plantations.

DESCR. OF WOOD :—*Colour* reddish-brown. *An. rings* marked by a continuous line of pores, with few or no pores in autumn wood. *Pores* moderate-sized, scanty, uniformly distributed, often subdivided, sometimes filled with resin. *Med. rays* very short, very numerous, moderately broad, uniform and equidistant, giving a handsome silver-grain. Hard; seasons and works well; the weight varies much according to the locality. Calcutta specimens weigh about 44 lbs. per c.ft.

USES :—Wood used more extensively for furniture in Europe. Also used in ship-building.

SYMPLOCOS BEDDOMII C. B. Clarke.

FAM.—Symplocaceæ.

COM. NS. :—*E. Californian* Cinchona, China Nora, Lodh Tree; *G. Loder*; *H. Lodh*; *K. Belaloddu* Jinamara, Manithristi; *M. Hura*, *Lodha*, *Lodhra*, *Sukaila*.

CHAR. :—A small evergreen tree beautiful with a shady head; 6-7 m. high; girth 3-45 m. *Bark* dark-grey, rough with large open lenticels, inner bark whitish. *L.*—coriaceous, shining above, elliptic, oblong or lanceolate, obtusely acuminate, more or less serrulate, turning yellowish in drying. *Fl.*—small, yellowish, fragrant, sub-sessile, on short, axillary, simple or branched villous racemes; bracts and bracteoles pubescent. Calyx-lobes 5, ciliate, small, petals larger than sepals. Stamens numerous, unequal, as long as the petals, and inserted at their base. Ovary 3-celled. *Fr.*—narrow, oblong, more or less distinctly ribbed, purple when ripe, 1·3 cm. long, enclosing a hard, 1-3-celled nut, with 1 or 2 seeds by abortion. *Fl. t.*—Nov.-Jan. *Fr. t.*—Apr.-May.

DISTR. :—Evergreen forests and moist places near nalas; Konkan and N. Kanara ghats and borders of evergreen forests. Deccan. Mahabaleshwar. S. M. Country; Western Peninsula. Throughout N. E. India from Tarai of Kumaon to Assam; Burma, Pegu.

DESCR. OF WOOD :—*Colour* sap-wood white, heart-wood yellowish-brown with darker patches; close-grained. *Pores* small, numerous, usually evenly distributed. *Med. rays* fine and moderately broad, the latter short. *An. rings*, indistinctly marked by rings of white tissue. Soft. *Wt.*—40 lbs. per c.ft.

USES :—Wood used as fuel at Mahabaleshwar and Panchgani.

SYMPLOCOS SPICATA Roxb.FAM.—*Symplocaceæ*.COM. NS. :—*H. Lodh*; *M. Gowuli*, *Mirjoli*.

CHAR. :—A large evergreen shrub or small or middle-sized tree. *Bark* light-grey, thin, smooth. Young parts glabrous except the inflorescence. *L.*— $7.5-15 \times 2.5-4$ cm., elliptic-oblong, obovate or lanceolate, obtuse or shortly acuminate, entire or irregularly toothed, tapering into a petiole, coriaceous, shining, and in a dry state yellow. *Fl.*—numerous, small, almost sessile, yellowish, white, forming more or less branched axillary spike. Calyx 5-parted; lobes exceedingly short, broad; petals, small, cohering in a ring with the stamens, which are about 40, long exserted. Ovary 3-celled. Stigma large. *Fr.*—drupe, size of a pea, turbinate, olive-coloured, 12-ribbed, containing a one-seeded nut. *Fl. t.*—Aug.-Dec. *Fr. t.*—Mar.-Apr.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara ghats common. North and Eastern India up to 1,500 m. Assam, Western Peninsula, common in the Shola-forests in the Nilgiris at the higher elevations: Ceylon, Burma.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* marked by few pores in the autumn wood. *Pores* small, evenly distributed. *Med. rays* of two classes, few fine short, many very fine. Soft; liable to split; not durable, light. *Wt.*—37 lbs. per c.ft.

USES :—Wood is used as fuel. The seeds, which have the shape of a small fluted pitcher (*Lota*) are strung and worn round the necks to avert evil. Leaves are used in the Darjeeling hills to give a yellow dye.

See—*Dyces* and *Tans*.

SYZYGIUM CARYOPHYLLATUM Alst.

(EUGENIA CORYMBOSA Lamk.)

FAM.—*Myrtaceæ*.COM. NS. :—*K. Bhelsee*, *Kunti*, *Neerli*; *M. Nimbuli*, *Raṭlavang*.

CHAR. :—A large shrub or a small tree. *Bark* smooth, grey, scaly. *L.*—sub-coriaceous, $6.3-9 \times 2.2-4.5$ cm., obovate obtuse or suddenly and shortly bluntly acuminate, bright green and shining above, paler and faint dotted beneath, base tapering; main nerves conspicuous beneath, uniting in an intramarginal nerve. *Fl.*—numerous, small, sessile, in terminal corymbose laxly trichotomous cymes; buds globose. Calyx campanulate, externally rugose; lobes 4, shallow. Petals white, calyptrate. *Fr.*—depressed globose, dark purple or black, about the size of a pea, 1-seeded, shining, juicy, edible. *Fl. t.*—Mar.-May. *Fr. t.*—rainy season.

DISTR. :—Throughout the Konkan and N. Kanara; in moist forests, along the banks of rivers and streams; very common near the sea-coast. Western Peninsula, South India: Ceylon,

DESCR. OF WOOD :—*Colour* light-brown. *Pores* moderate-sized, often sub-divided, uniformly distributed. *Med. rays* fine, very

wavy from being bent round the pores. *An. rings* not very clear. Soft, smooth. *Wt.*—54 lbs. per c.ft.

USES :—Fruit edible.

See—Fruit Trees.

SYZYGIIUM CUMINI Skeel.

(EUGENIA JAMBOLANA Linn.)

FAM.—Myrtaceæ.

COM. NS. :—*E.* Black or Java plum, Jambul; *G.* Jambu, Jambudi, Jambura; *H.* Jam, Jamen, Pharenda; *K.* Jambu or Nayinerale, Neralu; *M.* Jambul; *Tr.* Jaman.

CHAR. :—A large evergreen tree, 24-30 m. high; girth 1·5-3·6 m. *Bark* up to 2·5 cm. in thickness, light to dark-grey or brown, fairly smooth with shallow depressions caused by exfoliation, red inside, glabrous. *L.*—7·5-15 cm., coriaceous, smooth, shining, entire, ovate or oblong-lanceolate, more or less acuminate, penninerved, the numerous veins uniting within the margin. *Fl.*—numerous, greenish-white, odorous, in short and compact paniced cymes, usually lateral on the previous year's branches, occasionally axillary, or terminal, calyx tube funnel-shaped, truncate or obscurely lobed. Petals cohering and falling off in a calyptra. *Fr.*—berry, oblong or sub-globose, 6-2·5 cm., crowned with the base of the calyx, purple, succulent when ripe. *Fl. t.*—Mar.-May. *Fr. t.*—Apr.-July. Renewes leaves in hot season while old ones are falling off. The cultivated fruit is often large. This tree is very variable in shape of leaves, size of fruit and height. *Var. caryophyllifolia* with ovate-lanceolate, long acuminate leaves and globose fruit, size of a pea: common at Mahabaleshwar. *Var. obtusifolia* with obtuse leaves and large oblong fruit: in Konkan.

DISTR. :—Throughout the State, both wild and cultivated along river banks and moist localities. Common at Mahabaleshwar, Khandesh, Akrani and highest hills of Nasik and Satara districts. Common in the moist forests of N. Kanara and the Konkan. Throughout India. Ceylon, Malaya, Australia; very often planted.

DESCR. OF WOOD :—*Colour* reddish-grey, darker near the centre; no distinct heart-wood. *An. rings* generally marked by a line with few or no pores. *Pores* moderate-sized or small, numerous, frequently oval, elongated and sub-divided, joined together in wavy concentric belts of loose pale tissue. *Med. rays* fine, numerous, the interval between the rays less than the diameter of the pores round which they bend. Moderately hard, rough, strong, durable; lasts well under water; easy to saw and work to a clean finish; the regular wavy grain gives a mottled effect on finished planks; takes a good polish. *Wt.*—48 lbs. per c.ft.

USES :—Good average wood for construction work and house-building; used for building boats, carts and their parts, agricultural implements, rice mortars, well-curbs, common furniture, carving and turning; fairly good for railway sleepers. Bark, fruits and seeds used medicinally. Bark and an extract like gum are used in dyeing

and tanning. Fruit is very tasty and is much eaten. Pleasant syrup and vinegar are prepared from the fruits. It is one of the trees on which "tasar" silk-worm is fed. Leaves are used as fodder.

See—Medicinal Plants, Fruit Trees, Fodder Plants, Dyes and Tans.

SYZYGIIUM GARDENERI Thw.

(EUGENIA GARDENERI Duthie.)

FAM.—Myrtaceæ.

COM. NS.:—No common names.

CHAR.:—A very large, glabrous, evergreen tree, with smooth, white, terete, branchlets. Bark smooth, pale-grey. L.—3.8 × 2.2-5.6 cm., elliptic-oblong, caudate-acuminate, minutely pellucid dotted, base acute; main nerves parallel, close, uniting in an intra-marginal nerve. Fl.—white, .6-.8 cm., across, numerous, sessile, usually in threes, at the extremities of the branches of copious axillary and terminal cymes shorter than the leaves; buds globose. Calyx campanulate, rugulose outside with obscure segments. Petals calyptrate. Fr.—spherical about 1.1-3 cm. in diam., not crowned with calyx.

DISTR.:—Gairsappa ghat above Malimani at an elevation of 600 m. (N. Kanara); Western Peninsula ghats; Travancore; Ceylon.

DESCR. OF WOOD:—Colour dark, reddish-brown. Pores small, in patches of pale tissue, joined by very fine, wavy, concentric but interrupted lines. Med. rays very fine, numerous. Very hard, average. Wt.—57 lbs. per c.ft.

USES:—Not available.

SYZYGIIUM HEMISPHERICUM, Alst.

(EUGENIA HEMISPHERICA Wt.)

FAM.—Myrtaceæ.

COM. NS.:—No common names.

CHAR.:—A moderate-sized tree. Bark yellowish-grey, smooth, scaly, inner bark red. L.—7.5-12.5 × 4-7 cm., ovate-lanceolate, acuminate or rounded at the apex, minutely dotted, glabrous, shining, base tapering, nerves prominent beneath. Fl.—fragrant, in axillary and terminal paniculate cymes, which are sometimes in pairs. Calyx tube hemispheric, lobes rounded. Petals cream-coloured or with a pink tinge, gland-dotted, reflexed. Fr.—berry, globose 2.2-2.5 cm. in diam., crowned with calyx. Fl. t.—Mar.-Apr. Fr. t.—rainy season.

DISTR.:—On the Konkan and N. Kanara ghats, in evergreen forests; common on the Nilkund, Ram, and Ainshi ghats and throughout Siddapore sub-division. South India: Ceylon.

DESCR. OF WOOD:—Colour light-brown. Pores small, numerous, single or in rows. Med. rays fine, not distinct, crossed

by fine wavy lines of light tissue, also rather indistinct. Hard. Wt.—46 lbs. per c.ft.

USES :—Not available.

SYZYGium JAMBOS Alst.

FAM.—Myrtaceæ.

COM. NS. :—E. Malay of Rose-apple, Gulabjaman; K. Jambu, Panneerli; M. Gulabjamb.

CHAR. :—A small evergreen tree. *L.*—opposite, 12·5-20 cm. long, lanceolate, narrowed into a short petiole; secondary nerves joined by prominent intramarginal nerve. *Fl.*—in short terminal racemose cymes, with pairs of flowers, large, handsome, showy with long stamens, greenish-white. *Fr.*—globose, white, 2·5-5 cm., fleshy, scented. Seeds 1-2, grey, loose in the cavity. *Fl. t.*—Feb.-Mar. *Fr. t.*—July-Aug.; also at the other times during the year.

DISTR. :—Cultivated, also wild. Cultivated occasionally in the gardens in the Bombay State. Some fine trees are planted on the hill fort of Pratapgad near Mahabaleshwar. Run wild and planted near villages in N. Kanara; Sikkim Tarai; Yunnan to Australia.

DESCR. OF WOOD :—*Colour* brown, with fairly regular wavy concentric lines of loose texture. *Pores* small to moderate-sized, numerous, usually in radial or oblique lines. *Med. rays* fine, numerous bent round the pores. *Soft.*

USES :—Fruit is eaten but is more pleasant to sight, due to its colour than the taste. Bark, fruit and seeds used medicinally.

See—Medicinal Plants, Fruit Trees.

SYZYGium ZEYLANICUM DC.

(EUGENIA SPICATA Lamk.)

FAM.—Myrtaceæ.

COM. NS. :—K. Hole-lucky, Nerkal; M. Bhedas, Pitkuli.

CHAR. :—A large shrub or a small tree, very handsome when in full flower. *Bark* pale-brown, scaly; inner bark thick, red or brown; branchlets purplish-brown, shining, 4-angled. *L.*—aromatic when bruised, coriaceous, variable, 4-10 × 9-4 cm. ovate-elliptic to linear-lanceolate, smooth and shining on both sides, paler and minutely glandular beneath, margins slightly recurved, base acute. *Fl.*—white, conspicuous, in axillary and terminal many-flowered panicle cymes, calyx funnel-shaped, tubercled outside, lobes 4-5, broadly ovate, concave, erect. Petals 4-5, orbicular, calyptrate. *Fr.*—pisiform, size of pea, pure white, 1-seeded. *Fl. t.*—Feb.-Apr. *Fr. t.*—rainy season.

DISTR. :—Throughout the Konkan and N. Kanara ghats along rivers and nalas; common in N. Kanara. Western Peninsula, Silhet; Malay Peninsula to Singapore, Andamans.

DESCR. OF WOOD :—*Colour* grey. Close-grained. Hard.

USES :—Wood used for building purposes and agricultural implements.

TAMARINDUS INDICA Linn.

FAM.—Cæsalpinaceæ.

COM. NS.:—*E. Tamarind* tree; *G. Amli*; *H. Amli*, *Imli*, *Nuli*, *Teter*; *K. Amla*, *Amlike*, *Hunase*; *M. Chinch*.

CHAR.:—A large evergreen tree, 12-18 m. high. *Bark* 1·3 m. thick, dark-grey, with longitudinal fissures and horizontal cracks. *L.*—abruptly pinnate, 5-12·5 cm. long; rachis channelled; leaflets subsessile, 10-20 pairs, closely set. *Fl.*—in lax few-flowered racemes at the end of branchlets; corolla petals 3 (one upper and 2 lateral). subequal, yellowish with pink stripes; stamens 3 fertile. *Fr.*—pod, 7·5-20 × 2·5 cm., 1 cm. thick, slightly curved, scurfy, seeds 3-12, obovate-oblong, truncate ends with a shallow oblong pit on each of the flat faces, brown, shining. *Fl. t.*—Apr.-June. *Fr. t.*—ripe Feb.-Mar.

DISTR.:—Evergreen forests of Konkan and N. Kanara; shady parts of rain forests. Self-sown near villages and in waste lands, also cultivated throughout the State. Throughout India and Tropics, generally, indigenous in tropical central Africa.

DESCR. OF WOOD:—*Colour* sap-wood yellowish-white, sometimes with red streaks; heart-wood small, near the centre of old trees only, dark purplish-brown, with an irregular outline and radiating ramifications. Close-grained. *An. rings* indistinct. *Pores* moderate-sized, uniformly distributed, each pore or group of pores surrounded by round patches of soft tissue, which are sometimes confluent. *Med. rays* very fine, very numerous, uniform and equidistant. Hard, very durable, difficult to work but highly prized. *Wt.*—sap-wood 62 lbs. per c.ft., heart-wood 80 lbs. per c.ft.

USES:—Wood is used for wheels, oil and sugar-mills, rice-pounders, mortars, ploughs, mallets, planes, tool-handles, furniture, house-fittings, well-construction, cooper's work, side planks of boats, turning, etc. Fruit-pulp is used in medicine; it is also made into preserves and exported to Europe. Leaves and fruit-pulp used in curries; the ground seeds mixed with gum furnish a strong cement. An excellent avenue tree.

The seed powder is now used largely for preparing sizing material for the textile industry. It is a source of *pectin* used in the food industry.

See—Medicinal Plants, Fruit Trees.

TAMARIX DIOICA Roxb.

FAM.—Tamaricaceæ.

COM. NS.:—*H. Laljhav*.

CHAR.:—A very graceful gregarious shrub or small tree; trunk short, 1·8-2·1 m. high, rarely 4·5 m., branches with drooping extremities. *Bark* grey, with reticulate cracks, showing the red inner bark. *L.*—small, scale-like, tubular, sheathing, obliquely-truncate and pointed, glabrous and green. *Fl.*—dioecious, numerous, sessile, rose-coloured, in terminal paniced spikes. Bracts acuminate.

Male fl.—stamens 5, inserted in the notches of disc, anthers sagittate, purple. *Female fl.*—stamens abortive. *Fr.*—capsule, oblong, tapering. *Fl. t.*—May-July. *Fr. t.*—cold season.

DISTR. :—Common in the beds of the Konkan and Deccan rivers ; Cutch ; Bengal, Punjab, and almost all over India near river beds and the sea-coast ; Sind, Burma. Cultivated in the gardens.

DESCR. OF WOOD :—*Colour* red, outer portion white. Open-grained. *Pores* small to moderate-sized, in groups or short radial lines, more abundant and larger in the spring-wood. *Med. rays* very prominent, on a radial section. The distance between the rays is generally three or four times the transverse diameter of the pores. Moderately hard. *Wt.*—49 lbs. per c.ft.

USES :—Wood chiefly used as fuel for railway engines and steamers, also used for hut-building. Branches and twigs are used for baskets and brooms. Galls are used as a mordant in dyeing and in tanning. It gives a gum of bitter sweet flavour.

See—Dyes and Tans, Gums and Resins.

TAMARIX ERICOIDES Rottl.

FAM.—Tamaricaceæ.

COM. NS. :—*M. Jhau*, *Sarab*, *Sarata*.

CHAR. :—A beautiful shrub or a small tree, stem slender. *Bark* dark-brown, vertically cleft. *L.*—minute, scale-like, sheathing. Spikes terminal, 10·4-14·6 cm. long. *Fl.*—·67 cm. diam., rose-coloured, resembling those of the common heath, hence the specific name. Stamens 10, not exceeding the petals. Capsule 1·34 cm. ; seeds feathered with long spreading hairs. *Fl. t.*—Sept.-Dec.

DISTR. :—Common in the rocky beds of the Panch Mahals, Deccan and Konkan rivers, Bengal, Madhya Bharat, Madras : Ceylon. Often cultivated in the gardens.

DESCR. OF WOOD :—*Colour* reddish-white. *Pores* small to moderate-sized, often in groups and more numerous in the inner part of each ring. *Med. rays* moderately broad, the distance between them greater than the transverse diameter of the pores or groups of pores. Moderately hard.

USES :—Wood used as fuel. Twigs used for making brooms or brushes in the Poona and Ahmednagar districts.

TAMARIX TROUPII Holc.

(TAMARIX GALLICA, Linn.)

FAM.—Tamaricaceæ.

COM. NS. :—*H. Rukh*, *Pilchi* ; *M. Jhau*.

CHAR. :—A tall glaucous shrub or small tree ; sometimes attaining the height of 9 m. and a girth of ·9 m. *Bark* rough, greenish brown. *L.*—minute, scale-like, oblong or lanceolate, semi-amplexicaul, glaucous, white-margined. *Fl.*—bisexual, pentamerous,

generally white, rarely pink, short-pedicelled, crowded in slender-panicled racemes at the ends of branches. Sepals much shorter than the petals. Disc 10-toothed, shallow. Ovary somewhat 3-gonous. Styles 3, rather long, slightly connate. Capsules about 3 lin. long. *Fl. t.*—rainy season Aug.-Feb. (Brandis). *Fr. t.*—cold season.

DISTR. :—Cutch, Punjab, Bengal. Throughout India from the Western Himalayas southwards through the Peninsula, in sandy river-beds and the sea-coast : Sind, Afghanistan, Persia, Ceylon and Burma. Countries round the Mediterranean, through Western and Northern Asia to China and Japan.

DESCR. OF WOOD :—*Colour* whitish, sometimes with reddish tinge; open and coarse-grained. *Pores* small and moderate-sized, numerous, more so in spring wood. *Med. rays* numerous, broad but short. *An. rings* distinct. Fairly hard and tough but not strong. *Wt.*—40-48 lbs. per c.ft.

USES :—Wood largely used for fuel especially for steamers. Used also for poles, rafters, well-construction, agricultural implements, turnery and lacquered work. It yields a kind of gall, known in the bazar as *Maiphal* (*H.*) or Sumrat-Ul-turfa (Arab) containing tannic and gallic acids, which are used as a mordant in dyeing, and also are used medicinally. The shrub is said to yield a kind of manna called *Gosan-jabin*.

See—Dyes and Tans.

TECOMA UNDULATA G. Don.

FAM.—Bignoniaceæ.

COM. NS. :—*K. Kangeli*; *M. Rakta-rohida*.

CHAR. :—A large evergreen shrub or a small tree, glabrous, with branches drooping like the weeping willow and stellately grey-tomentose, 9-12 m. high; girth 1.5-2.4 m. *Bark* corky, reddish-brown. *L.*—7.5-10 cm., opposite or sub-opposite, linear-lanceolate, or obovate-oblong, entire, much undulated, clothed with minute white scales; petioles slender 2.5 cm. *Fl.*—large, about 5-7.5 cm. long, bright, orange-coloured, inodorous, 5-10 in corymbose racemes. Calyx campanulate, 5-toothed. Corolla campanulate. Ovary 2-celled on a cup-shaped disc. *Fr.*—capsule, slender, linear-compressed, 15-20 cm. *Fl. t.*—Feb.-Apr. *Fr. t.*—May-July. When in flower the tree is a beautiful sight.

DISTR. :—West Khandesh, Gujarat, Western India, Punjab, Rajasthan extending eastwards to the Jumna : Sind. Planted in gardens as an ornamental tree.

DESCR. OF WOOD :—*Colour* greyish or yellowish-brown, mottled with lighter streaks. Close-grained. *Pores* small and moderate-sized, often sub-divided, enclosed in small rounded patches, which are sometimes arranged in concentric lines. *Med. rays* short, fine and moderately broad, prominent on a radial section as a silver-grain. Hard, tough, strong, durable; works well and takes a fine polish. *Wt.*—44 lbs. per c.ft.

USES :—Wood is highly prized for furniture, carving work and agricultural implements. Used also for house-building (Marwar), carts, oil-presses, bowls, drums. Leaves are eaten by cattle.

See—Fodder Plants.

TECTONA GRANDIS Linn.

FAM.—Verbenaceæ.

COM. NS. :—*E.* Indian Oak, Ship-Tree, Teak; *G.* Sag, Sagach; *H.* Sagun, Sagwan; *K.* Tega, Tegu; *M.* Sag, Sagwan; *Tr.* Teak.

CHAR. :—A large deciduous tree, 21-30 m. high, girth 3.6-4.5 m. (occasionally exceeding 6 m). *Bark* light-brown or grey, fibrous, with shallow longitudinal cracks, outer bark peeling off in long thin flakes. Branchlets quadrangular, channelled, stellately tomentose. *L.*—opposite 30-60 × 15-30 cm. (much larger in seedlings), rough above, grey tomentose beneath. *Fl.*—shortly pedicelled in cymes. Corolla tubular, 5-6 lobes, lobes unequal, white. *Fr.*—sub-globose, somewhat 4-lobed, pericarp dense hairy, endocarp bony. *Fl. t.*—June-Sept. *Fr. t.*—Nov.-Jan. Sheds leaves early in cold season, new foliage in May.

DISTR. :—Throughout the State in monsoon and mixed deciduous forests; abundant all along the slopes of Western ghats to the Mahi river in Gujarat. Best teak-forests in Bombay State are on the slopes of Kalinadi and the Gangavali rivers of N. Kanara. Western ghats of Madras State, Circars, Madhya Bharat; Malay Peninsula, Burma, Sumatra, Java.

DESCR. OF WOOD :—*Colour* sap-wood white, usually small, heart-wood dark, golden-yellow, turning brown, dark-brown and finally almost black with age. *An. rings* marked by one or more lines of regularly arranged pores, often set in a belt of loose tissue; in the rest of the wood they are scattered, scanty, sometimes subdivided, variable in size from small to moderate-sized, a few large. *Med. rays* moderately broad to broad, fairly numerous giving a conspicuous handsome silver-grain of elongated plates. Pith large quadrangular. Strongly and characteristically scented and containing an oil which is easily perceptible to the touch and is a preservative. A strong wood of average hardness and of outstanding merit in retention of shape and durability. The most naturally durable wood of the world. Sap-wood is very perishable and is usually quickly destroyed by rot, white ants and borers, but can be readily treated with preservatives; easy to saw and work. The wood from dead or fallen trees is lighter and stronger than from trees killed by girdling. *Wt.*—45 lbs. per c.ft.

USES :—Wood used for house-building, bridge-construction, building of ships of all descriptions and their parts, furniture and cabinet-work, carpentry of all kinds, carving, turning, well-construction, agricultural implements, railway keys, all parts and bodies of carts and carriages, looms, frames of spinning wheels, cotton-cleaning apparatus (Madhya Pradesh), combs, jars, bowls, brush-backs, toys, tobacco-pipes (from the hard knots of occluded branches), and many minor purposes; good deal used for railway sleepers, telegraph

poles; most extensively used for the construction of all classes of railway carriages and waggons in India; largely used for tubs, buckets, barrels and cooperage in general. In ordnance depots for boarding of tongas, double-decked platforms, skids, hold-fasts, rammer and spong-staves, axle-beds of transport carts, planking for waggons, boxes for maxim-gun ammunition and other small boxes. Teak from Burma and S. India is preferable for constructional and utility purposes, while teak from the Deccan and the Dangs is preferable for beauty of grain and colour. Root, bark, wood, flowers and seeds are used medicinally. Tree yields good oil, which is considered a substitute for linseed oil in preparation of paints. Yields also good varnish. Leaves used as plates and for wrapping parcels and thatching. A yellow dye is also made from them. Young leaves and twigs are eaten by cattle.

See—Medicinal Plants, Oils, Dyes and Tans, Fodder Plants.

TERMINALIA ARJUNA W. & A.

FAM.—Combretaceæ.

COM. NS.:—E. White Murdah; G. Arjun-Sadada, Dadado; H. Arjan, Arjuna, Kahu, Koha; K. Hole-matti; M. Arjun, Arjuna-sadada; Tr. Arjun.

CHAR.:—A large deciduous tree with thick buttressed trunk and horizontally spreading branches, about 24 m. high, girth 3·6 m. Bark smooth, pinkish-grey, the old layers peeling off in thin flakes. L.—13-20 cm., sub-opposite, coriaceous, glabrous when old, oblong or elliptic, often suddenly narrowed or cordate at the base, obtuse or acute at the apex; petiole with 2 glands near its apex, or at the base of the leaf. Fl.—dull-yellow disposed in pedunculate, terminal and axillary spikes, usually paniced. Fr.—2·5-5 cm., coriaceous; thick wings, truncate or narrowed at the summit, marked with ascending cross lines. Fl. t.—Apr.-May. Fr. t.—end of rainy and cold season.

Var. *angustifolia* C. B. Clarke (*Pentaptera angustifolia* Roxb), with branches drooping, leaves much narrower, oblong, attenuated into the petiole, sometimes very shortly acuminate at the apex.

DISTR.:—Along banks of rivers and streams, very common in south Konkan and jungles south of Surat, Matheran, S. M. Country (Belgaum); throughout the greater parts of India in the Sub-Himalayan tracts, Chota-Nagpur, Madhya Bharat, Madhya Pradesh, Madras State: Ceylon.

Var. *angustifolia* is found in Konkan and S. M. Country on the banks of the Chataprabha and the Kalinadi.

DESCR. OF WOOD:—Colour sap-wood reddish-white; heart-wood brown, variegated with darker-coloured streaks. An. rings doubtful. Pores moderate-sized and large, sometimes very large, uniformly distributed, often sub-divided into 2 to 4 compartments, each pore surrounded by a ring of soft tissue. Numerous, thin, wavy, concentric lines, which frequently anastomose. Med. rays very fine, very numerous. Pores prominent on a longitudinal section. Very hard; apt to warping and splitting in seasoning; kiln-seasoned

without difficulty or degrade; sap-wood very perishable, heart-wood moderately durable; not easy to work or saw; can be brought to a very good and lasting polish. *Wt.*—59 lbs. per c.ft.

USES :—Wood used for house-building, carts and their parts, agricultural implements, boats, brush-backs; for mine supports in Mysore Gold-fields. Bark and gum are used medicinally; bark is also used in dyeing and tanning.

See—Medicinal Plants, Dyes and Tans.

TERMINALIA BELERICA Roxb.

FAM.—Combretaceæ.

COM. NS. :—*E.* Bastard Myrabolan, Bedda Nut, Beleric Myrabolan; *G.* Behedo, Beheza, Bera; *H.* Bahara, Buhura, Sagona; *K.* Shantimara, Tare, Vibhata; *M.* Beheda, Bela; *Tr.* Behera.

CHAR. :—A large handsome deciduous tree, 18-30 m. high, girth 2.4-6 m. *Bark* bluish or ashy-grey with numerous fine longitudinal cracks, yellow inside. Young branchlets and calyx clothed with rusty pubescence. *L.*—7.5-15 cm. crowded at the end of the branches, alternate, coriaceous, broadly-elliptic or obovate-elliptic, obtuse, retuse, or short-acuminate at the base, often unequal at the base, deciduous; petioles 2.5-6.5 cm. *Fl.*—small, grey or greenish-yellow with an offensive smell, arranged in simple solitary, axillary or infra-axillary spikes, upper-flowers of the spike male, lower hermaphrodite. Calyx pubescent with long rusty hairs inside. *Fr.*—1.3-2 cm. diam., ovoid, grey, when dry obscurely 5-angled. *Fl. t.*—Feb.-May. *Fr. t.*—next rainy and cold season. Sheds old leaves Feb.-Mar.; new leaves Apr.

DISTR. :—Common throughout the State, in deciduous mixed monsoon forests, in Khandesh Akrani up to 1,200 m. Throughout the forests of India, Rajasthan: Sind, Ceylon.

DESCR. OF WOOD :—*Colour* yellowish-grey, no heart-wood. *An. rings* indistinct. *Pores* very scanty, large, frequently subdivided, joined by irregular, wavy, concentric bands of soft loose cellular tissue. Fine, uniform and equidistant. *Med. rays* are distinctly visible in the harder and darker portions between the bands and on the radial section, where too the pores are prominent. Hard, strong but very perishable and liable to attack from fungi and insects; seasons without difficulty or degrade; kiln-seasoned quickly without difficulty and comes out of the kiln in very good condition, easy to saw and machine but difficult to bring to a smooth surface. *Wt.*—48 lbs. per c.ft.

USES :—Wood is used for inferior house-building, planking, coffee-boxes, dug-out canoes, side planks of boats and catamarans (S. India), carts and their parts, grain-measures, cooper's work, turning. Timber, if rendered impervious against attacks of white ants and dry-rot, would probably make excellent and cheap railway sleepers; recommended as definitely suitable for plywood work as it makes up into good ply-wood of pleasing appearance. Fruit, beleric

myrabolans of commerce, is used for dyeing cloth, leather and marking ink. Kernels are generally eaten, but produce symptoms of poisoning if eaten in large quantities. Fruit used medicinally; oil from kernels is used for hair. An insipid gum issues from wounds in the bark and is not of much use as it is insoluble in water.

See—Medicinal Plants, Dyes and Tans, Oils, Gums and Resins.

TERMINALIA CATAPPA Linn.

FAM.—Combretaceæ.

COM. NS. :—E. The Indian Almond ; H. Bengali-badam ; K. Taree ; M. Deshi-badam.

CHAR. :—A large deciduous (in Bombay almost evergreen) handsome tree, 9-12 m. high (in favourable conditions 18-24 m.), girth 1·8-2·4 m. Branches whorled, horizontal, forming table-like tiers. L.—15-23 cm., generally softly hairy when young, or glabrous, chartaceous, alternate, crowded at the ends of branches, obovate, oblong, apiculate, base cordate or narrow-rounded with a depressed gland on each side of the midrib. Fl.—small, greenish-white, forming solitary axillary spikes, shorter than the leaves; the upper flowers male, the lower hermaphrodite. Fr.—oval, or ellipsoid, compressed, with 2-elevated margins, 2·5-4 cm., rather convex on both sides. Fl. t.—cold season. Fr. t.—rainy season.

DISTR. :—Planted in gardens in Bombay and Poona ; also planted in the Konkan and N. Kanara. A native of the Moluccas.

DESCR. OF WOOD :—Colour red. Sapwood lighter coloured. Pores moderate-sized, scanty, joined by wavy, short, concentric bands of soft texture. Med. rays fine. Hard, light, durable. Wt.—32 lbs. per c.ft.

USES :—Wood used for house-building (posts, beams, etc.), yokes, naves, spokes of carts and general carpentry. The kernels of the nuts are eaten. The bark and leaves give a black dye. "Tasar" silk-worms are fed on the leaves of this tree.

See—Dyes and Tans.

TERMINALIA CHEBULA Retz.

FAM.—Combretaceæ.

COM. NS. :—E. Black or Chebulic-myrabolan ; H. Hirido ; H. Har, Harara, Haria ; K. Alate, Harade, Haritaki ; M. Hirda.

CHAR. :—A moderate-sized much-branched deciduous tree, 7·5-10·5 m. high, in favourable circumstances 24-30 m.; girth 1·5-3·6 m. Bark dark-brown with numerous generally shallow vertical cracks. Young parts more or less rust-coloured or silvery-hairy. L.—not clustered, mostly sub-opposite, ovate, or elliptic-ovate, acute and rounded at the base, 7·5-13 cm., deciduous; petiole often with 2 glands near the summit. Fl.—all hermaphrodite,

dull-white or yellowish, subtended with a downy bracteole, arranged in terminal, often paniced, spikes, 5-10 cm. long. *Fr.*—ellipsoidal or obovoid from a cuneate base, more or less distinctly 5-angled. *Fl. t.*—May-June. *Fr. t.*—in the next cold season. Sheds leaves in Feb.-Mar.; new leaves in Apr.

DISTR. :—Moist parts of the Deccan, on trap and common along ghats, common in Khandesh Akrani, monsoon forests of Belgaum district and N. Kanara. Throughout the greater part of India up to 1,500 m. in the Himalayas, Travancore, Burma, Ceylon.

DESCR. OF WOOD :—*Colour* brownish-grey with a greenish or yellowish tinge, with an irregular small, dark-purple heart-wood. Close-grained. *An. rings* indistinct. *Pores* small and moderate-sized, often sub-divided, singly or in groups surrounded by small patches of soft texture, which are slightly confluent into irregular, more or less concentrically arranged, bands. *Med. rays* very fine, uniform, equidistant, numerous, stopping at or bent round the pores or groups of pores. Very hard, fairly durable; rather difficult to work; takes a good polish. *Wt.*—64 lbs. per c.ft.

USES :—Wood is used for house-building (beams, scantlings, planking and door-frames), furniture, carts and their parts, agricultural implements, oars, and turning. The dried ripe fruits are the black or *chebulic myrabolans* of commerce. They are ovoid, more or less furrowed longitudinally, and of a yellowish-brown colour. There are two chief varieties to be met with in the bazars: *harda*, of a dark yellowish-brown colour, and *rangari harda*, smaller and of lighter colour. These fruits are extensively exported to Europe, and are valuable in the arts, as they contain a considerable amount of astringent principle. Bruised and immersed in water containing iron filings or salts of iron, they yield ink, and mixed with alum in solution, a good yellow dye. They are held in high repute as medicinal agents, and are a good substitute for galls in lotion. Six fruits are administered internally in dysentery, bleeding piles and other diseases requiring tonic astringents. The upripe dried fruits are called *bala-harda*. They are small, ovoid, black shrivelled bodies possessing the same properties as the ripe fruits, and are generally administered in the same cases, having been previously powdered, in ghee or castor oil. Curious hollow round galls, are found on the leaves of this tree, supposed to be caused by some unknown insect having deposited its ova there. They are very astringent, and are given in cases of infantile diarrhoea, and used in making ink, in dyeing and in tanning. They are known as *harda-phal* in the Deccan or *kadu ray* in Tamil. The bark is also used in tanning.

See—Medicinal Plants, Dyes and Tans.

TERMINALIA PANICULATA Roth.

FAM.—Combretaceæ.

COM. NS. :—K. Bilimatti, Honal, Hongal, Hunab, Ulvi; M. Kindal, Kinjal; Tr. Kindal.

CHAR. :—A very large deciduous tree. *Bark* rough, dark-brown, with numerous shallow longitudinal and transverse fissures, peeling off in flat flakes. Young parts, inflorescence and bracts rusty-pubescent. *L.*—10-18 cm., lower sub-opposite, upper alternate, coriaceous, nearly glabrous when old, oblong-elliptic, acuminate, cordate, generally with 2 sessile glands near the base of the midrib. *Fl.*—in very dense, terminal, compound panicles composed of spikes of reddish flowers. Bracts ovate, acuminate, recurved. Calyx reddish, with long hairs within. *Fr.*—6-1.3 cm., brown-red, villous, with one broad wing about 1.3 cm. and 2 smaller. *Fl. t.*—Aug.-Sept. *Fr. t.*—ripe Dec.-May.

DISTR. :—Throughout the State in mixed deciduous forests; common along the foot of ghats and vales of rivers in Konkan; abundant in jungles near Surat in Gujarat. S. M. Country. One of the most common trees in N. Kanara. Western Peninsula from Bombay Southwards to Cape Comorin.

DESCR. OF WOOD :—*Colour* grey with darker heart-wood. *Pores* large and moderate-sized, oval, often sub-divided, numerous, surrounded by faintly marked patches of soft tissue arranged in oblique and wavy lines and connected into somewhat concentric bands. *Med. rays* fine, uniform, wavy, numerous; the distance between them usually less than the diameter of the pores. Straight-grained and of medium texture. Very hard, strong, fairly heavy, refractory wood to season; develops surface cracks and splits if dried too quickly; kiln seasoning produces good results, moderately durable, easy to saw and work, takes a good polish. Unsuitable for ply-wood work. *Wt.*—56 lbs. per c.ft.

USES :—Wood used for house-building, agricultural implements, carts, timbering in mines, carriage and waggon work in railways; excellent constructional and general utility wood; frequently used as a substitute for teak. Bark gives a tan, and the branches are lopped off for "rab" burning in Konkan.

Bourdillon says that "the Travancore country people have a tradition that tigers will never attack cattle kept in sheds made of this timber".

See—Dyes and Tans.

TERMINALIA TOMENTOSA W. & A.

FAM.—Combretaceæ.

COM. NS. :—G. Hadri, Sadri; H. Asan, Sadri, Sain, Saj; K. Banapu, Kare-Matti, Matli; M. Ain, Madet; Tr. Laurel.

CHAR. :—A large deciduous tree, 24-30 m. high, girth 2.4-3 m. *Bark* 2.5 cm. thick, grey to black, with long, broad, deep, longitudinal fissures, and short, shallow, transverse cracks; inner substance red when fresh. Branchlets, young leaves, and inflorescence rusty-tomentose. *L.*—7.5-23 cm., sub-opposite or alternate, elliptic, ovate or obovate-oblong, glabrous or hairy when old, coriaceous, cordate or suddenly narrowed at the base into short petioles, with 2 glands near the base of the midrib. *Fl.*—of a dull-yellow colour in paniced spikes. *Fr.*—2.5-5 cm., obovoid-oblong, wings broad,

marked with prominent horizontal lines; edges of wings thin, irregularly crenulate. *Fl. t.*—Apr.-May. *Fr. t.*—Jany.-Apr. of next year. Sheds leaves Jany.-Mar.; new leaves at the end of the hot season.

DISTR. :—Common throughout the State in mixed deciduous forests, and in the jungles at the foot of the ghats in Konkan; throughout the moist regions of India : Ceylon.

DESCR. OF WOOD :—*Colour* sap-wood reddish-white; heart-wood dark-brown, hard, beautifully variegated with streaks of darker colour, showing on a radial section as dark undulating streaks. Straight-grained and of medium to coarse texture. *Pores* moderate-sized and large, uniformly distributed, each pore enclosed in an irregularly shaped and generally elongated patch of soft tissue; these patches are often arranged in concentric lines and frequently joined by thin, wavy, concentric bands. *Med. rays* not distinct, very fine, numerous, uniform, equidistant, often wavy, the transverse diameter of the pores many times larger than the distance between the rays. Hard, strong, tough; apt to split in seasoning, fairly durable; lasts well under water; a valuable and well known timber, next to teak the most important in this State. *Wt.*—67 lbs. per c.ft.

USES :—Wood used for house-building, rough furniture, carts, ships and boat-building, much used as mining timber in collieries; used for oil-mills, rice-pounders, agricultural implements, railway sleepers. Excellent fuel and furnishes good charcoal. Bark is used for tanning and dyeing black. Ashes of the bark give a kind of lime eaten with betel leaf. The "Tasar" silk-worm feeds on its leaves and lac is occasionally gathered from its branches. It gives a brown gum.

See—Dyes and Tans, Gums and Resins.

TETrameles nudiflora R. Br.

FAM.—Datiscaceæ.

COM. NS. :—K. Bondale, Jarmala; M. Bondsä, Kapsin, Ugad, Ran-bhend (Janjira State); Tr. Baing.

CHAR. :—A very large deciduous tree, trunk straight, not branched below, buttressed at the base, 30-45 m. high; girth 3-4.5 m. *Bark* greyish-white, 2.5 cm. thick, spongy, marked with horizontal wrinkles and small vertical lines of lenticels; peels off in thin papery layers. *L.*—13-15 × 10-13 cm., rotundate or ovate, acute or shortly-acuminate, rounded at the base, serrate or almost entire, sometimes obsolete 3-lobed, membranous, pubescent when young, glabrescent when old. *Fl.*—small, apetalous, dioecious, greenish-yellow, calyx usually 4-fid; style 4. *Male fl.*—in erect panicles, clustered at the end of branches. *Female fl.*—in elongate, pendulous racemes. *Fr.*—capsule, ovoid very small, glandular-viscid dehiscent at the top. *Fl. t.*—Feb.-Mar. *Fr. t.*—Apr.-May. Sheds leaves in the beginning of hot season; new leaves in May.

DISTR. :—Common in the evergreen forests of the ghats of N. Kanara and the Konkan; Darjeeling, Tarai and outer hills of the

Himalayas. Western ghats and Nilgiris in "Sholas" and evergreen forests : Ceylon, Burma, Andamans.

DESCR. OF WOOD :—*Colour* white, coarse-textured. *An. rings* marked by a belt of close pores. Wood cells large. *Pores* large, often sub-divided and in short zigzag, transverse lines. *Med. rays* fine to moderately broad, clearly marked, the distance between the rays equal to the diameter of the pores. Soft, liable to fungal stain, decay and insect attack when green; kiln seasoning presents no difficulties; not strong but holds nails well; not durable; takes preservatives easily; easy to saw and work; finishes to a good surface. *Wt.*—24 lbs. per c.ft.

USES :—Wood used for well-construction, dug-out canoes, tea-boxes, packing-cases, ceiling boards. Very suitable for cheap utility ply-wood; also used in match factories for both boxes and splints.

THESPESIA POPULNEA Correa.

FAM.—Malvaceæ.

COM. NS. :—*E.* Tulip tree, Portia tree; *G.* Bendi, Parascha-pipla; *H.* Parsipu, Parascha-jhad; *K.* Asha, Huvarsi; *M.* Bhend.

CHAR. :—A moderate-sized, evergreen tree; attaining a height of about 9-10.5 m. and girth of about 9-1.2 m. *Bark* grey, smooth. All young parts covered with small rusty peltate scales. *L.*—7.8-13 × 7.8 cm., cordate, ovate, acute, acuminate or almost cuspidate, leathery, entire, glabrous, 5-7-nerved, with a glandular pore beneath, between the nerves; petiole long, usually 6.5 cm. Stipules falcate. *Fl.*—large, pale, sulphur-coloured, turning reddish, on axillary, slender peduncles. Bracteoles (epicalyx) 5, oblong-lanceolate, deciduous, as long as the bell-shaped, 5-toothed calyx. Corolla 5.2-7.8 cm. diam. Staminal tube 5-toothed at the apex. Ovary 5-celled. Style club-shaped, 5-furrowed. *Fr.*—capsule, 4 cm., coriaceous, globose, somewhat depressed, sprinkled with minute scales, ultimately glabrescent, 5-celled, indehiscent or opening slightly on the top. Seeds 2 in each cell, large, shortly tomentose or pilose. *Fl. t.*—throughout the year.

DISTR. :—Along the sea-shores of the Konkan and the N. Kanara; coast forests of India, Burma, Ceylon and Andamans; often cultivated as a road-side tree in towns near the sea-coast as at Calcutta, Madras, Bombay, Colombo.

DESCR. OF WOOD :—*Colour* of heart-wood dark-red. Even-grained. *Pores* moderate-sized, scanty, sub-divided, uniformly distributed. *Med. rays* fine, uniform; the distance between two rays generally equal to the transverse diameter of the pores. Sap-wood soft; heart-wood small, hard, smooth, strong, durable. *Wt.*—50 lbs. per c.ft.

USES :—Wood used for house-building, furniture, carts, carriages, and waggons, shafts (an excellent wood for the purpose), yokes, spokes, felloes, ploughs, gunstocks, boats, oars, cooper's work, turnery and carving (images). The bark gives a good fibre; and

the capsules yield a yellow dye, very like gamboge, which is used by dyers and also used medicinally in cutaneous diseases. Leaves used as cattle fodder.

See—Medicinal Plants, Fibres, Dyes and Tans, Fodder Plants.

TOONA CILIATA Roem.
(CEDRALA TOONA Roxb.)

FAM.—Meliaceæ.

COM. NS.:—*E.* Red or Moulmein Cedar, Toon tree; *H.* Lim, Mahanim, Tuni; *K.* Devdari, Gandagheri, Kempu, Tundu; *M.* Huruk, Maha-nim, Tadu; *Tr.* Toon.

CHAR.:—A large deciduous tree, 18-24 m. high, (more under favourable circumstances); 1·8-2·4 m. in girth. *Bark* dark grey-brown, exfoliating when old in irregularly woody scales; inner bark red, glabrous. *L.*—3·9 m. long, abruptly pinnate, deciduous. Leaflets 8-30, 5·18 × 2·8 cm., generally opposite or sub-opposite, obliquely ovate or lanceolate, acuminate or cuspidate, entire or slightly undulated or serrate, shining above and sometimes glaucescent beneath, on a rather long petiole. *Fl.*—white, fragrant, on slender short pedicels, arranged in large drooping, terminal panicles, about the length of the leaves or longer. Calyx segments 5, short, round. Petals 5, oblong, ciliate. Stamens 5, occasionally 6, alternating with staminodes, inserted on orange-coloured hairy lobes of the disc. Ovary 5-celled. *Fr.*—capsule, oblong, about 2·2-6 cm. long. Seeds compressed, winged below or at both ends. *Fr. t.*—Jan.-Feb. *Fr. t.*—Mar.-Apr.

DISTR.:—Ravines of Khandala; more or less abundant in the evergreen forests of the Konkan and N. Kanara. Forests of the sub-Himalayan tracts and valleys of N. W. Himalayas in the Punjab and eastwards chiefly along streams upto Sikkim and Assam. Eastern Bengal. Throughout Western and Southern India at low elevations: Burma. Often planted in avenues and gardens.

DESCR. OF WOOD:—*Colour* brick-red, shining, fragrant. Even-but open-grained. *An. rings* distinctly marked by a belt of large and numerous pores. *Pores* frequently double or sub-divided, unequally distributed, scanty in the autumn wood, somewhat unequal in size, prominent on a vertical section; those in the spring wood larger. *Med. rays* red, fine and moderately broad, uniform, bent round the pores; giving a marked silver-grain. Moderately strong, fairly durable; easy to air-season, kiln-seasoning offers no difficulty; does not split or warp; easiest of Indian woods to saw and work; takes a very good polish; makes up into a good type of ply-wood. *Wt.*—35 lbs. per c.ft.

USES:—Most commonly used for “bazar” furniture in India. House-building (chiefly planking and door panels), tea-boxes, cigar-boxes, well-construction, dug-out canoes, masts, oars; *satar* and similar musical instruments, toys, carvings, oil-casks, railway carriage furniture and gun-stocks. Flowers yield a red and yellow dye apparently adapted for colouring silken fabrics. The tree yields a resinous gum. Bark is astringent and is said to be used medicinally.

N.B.—This tree, owing to its rapid growth and the demand for its timber, deserves wider cultivation in localities suitable for it.

See—Dyes and Tans, Gums and Resins, Medicinal Plants.

TREMA ORIENTALIS Blume.

FAM.—Ulmaceæ.

COM. NS.:—*E.* Nettle or Charcoal tree; *H.* Bandu-manu; *K.* Bendakarka, Gorklu; *M.* Kapashi, Kargol, Ranambada.

CHAR.:—A fast-growing, short-lived evergreen tree, 7·5-9 m. high; girth 45·9 m. *Bark* smooth, grey, lenticellate. Branchlets more or less pubescent. *L.*—7·5-12 × 5·6·3 cm. ovate-oblong, acuminate, 3-nerved, cordate, and unequal-sided at the base, serrate, more or less rough on the upper side, with white pubescence beneath. *Fl.*—greenish, sessile or sub-sessile, in axillary cymes, usually longer than the petiole. *Fr.*—drupe, very small, globose, black when ripe, 1-seeded. *Fl. t.*—more or less throughout the year. *Fr. t.*—rainy season.

DISTR.:—Throughout the Konkan and N. Kanara in moist forests, common. More or less throughout India; from the foot of the Nepal Himalayas, Bengal, Bihar, and southwards to Travancore: Ceylon, Malay Islands.

DESCR. OF WOOD:—*Colour* light reddish-grey. *Pores* moderate-sized, often sub-divided, uniformly distributed. *Med. rays* fine, numerous, uniform. *Soft.* *Wt.*—about 30 lbs. per c.ft.

USES:—Wood makes a good gun-powder charcoal but is not very good as firewood. Inner bark yields tough and strong fibre. The tree is almost unequalled as a shade plant in plantations on cleared land, or for reclothing landslips. The first woody plant to appear in forests clearings.

Beddome remarks "It is curious how the tree springs up in all places where heavy moist forest has been cleared away for coffee or other purposes, although there may not be a plant of it within miles."

See—Fibres.

TREWIA NUDIFLORA Linn.

FAM.—Euphorbiaceæ.

COM. NS.:—*H.* Gamhar, Pindara, Tumri; *K.* Chillauri, Kadu Kange, Katkumbal; *M.* Petari; *Tr.* Gutel.

CHAR.:—A moderate-sized or large deciduous tree. 18-21 m. high; girth 1·8-2·1 m. *Bark* smooth, grey. The young parts more or less pubescent. *L.*—10-23 × 7·5-14 cordate or broad-ovate, sub-glabrous in age. *Fl.*—greenish-yellow; male, yellow in pendulous 1-4-flowered racemes 10-23 cm. long; female green on longer pedicels, solitary or in 2-3-flowered racemes; calyx-segments caducous. *Fr.*—drupe, globose, hoary, mucronate, about 2·5-3·8 cm. diam. Stone 2-5-celled. *Fl. t.*—Dec.-Mar. *Fr. t.*—rainy season. Leaves shed in Jan.-Feb.; new foliage Mar.-Apr.

Leaves resemble those of *Gmelina arborea* and *Thespesia populnea*.

DISTR. :—Throughout the Konkan and N. Kanara in moist monsoon forests, along nalas and in swampy localities. Throughout the hotter parts of India. Assam, Ceylon, Malay Peninsula, Java, Sumatra.

DESCR. OF WOOD :—*Colour* white. *Pores* moderate-sized, sub-divided and often elongated, the transverse diameter several times greater than the distance between the closely packed, uniform, fine *med. rays*. Fine ladder-like, straight or oblique bars crossing the tissue between the rays. Soft, no odour or taste; medium fine texture; very light; easy to season; does not split or warp; very prone to fungal strain, decay and insect attack; not strong, not durable; very easy to saw and work to a nice smooth finish; takes preservatives readily. *Wt.*—28 lbs. per c.ft.

USES :—Wood used for agricultural implements, drums, cooper's work, carved images, packing cases and boxes. A good plywood timber. Has been found excellent for matches and match-boxes. Plant is used medicinally. Leaves are fed to cattle.

See—Medicinal Plants, Fodder Plants.

UNONA PANNOSA Dalz.

FAM.—Anonaceæ.

COM. NS. :—No common names.

CHAR. :—A small tree, young parts puberulous. *L.*—5·9-10·4 × 2·4 cm., ovate-lanceolate, obtusely acuminate, rounded or acute at the base, glabrous above, pubescent beneath, thin, pellucid-dotted. *Fl.*—brown-tomentose, axillary, of a dirty-white colour, on very short peduncles, surrounded with one or more scaly bracts. Sepals ovate-acute, 3 lines long, villous on the outside. Petals 4·5-2 cm. long, lanceolate, villous, inner narrower and shorter. Ovaries 8-12, densely strigose; ovules 2-4. *Carpels* 5-8, oval-obtuse, subsessile, pubescent, seeds 1-3, large, shining. *Fl. t.*—Oct.

DISTR. :—Common in the Western ghats from Konkan southwards; Kanara; Malabar up to 1,050 m. Endemic in W. Ghats.

DESCR. OF WOOD :—The wood is good, tough and strong.

USES :—Good fibre is extracted from the inner bark.

See—Fibres.

VATERIA INDICA Linn.

FAM.—Dipterocarpaceæ.

COM. NS. :—*E.* Indian Copal or Piney Varnish tree, Malabar White Pine; *K.* Dhupada, Gule, Illupathla, Munda dhupa; *M.* Dhupa; *Tr.* Vollapiney.

CHAR. :—A large handsome evergreen tree, young shoots and inflorescence clothed with scurvy stellate tomentum; stem cylindrical, sometimes 1·5 m. in diameter. *Bark* whitish-grey, rough, peeling off in round thick flakes. *L.*—coriaceous, glabrous,

elliptic-oblong, blade 10·4-26 cm long., petiole 2·6-4 cm. long; midrib and secondary nerves (14-16 pairs) prominent beneath. *Fl.*—1·34 cm. across, in large terminal panicles. Petals spreading, slightly pubescent outside, stamens 40-50, filaments short, anthers linear, hairy at the base. Ovary tomentose. *Fr.*—ovoid, 5·2-6·54 cm. long, splitting open in 3 valves. Cotyledons filled with fat (piney tallow). *Fl. t.*—Mar.-Apr. *Fr. t.*—rainy season. Young leaves appear in cold season.

DISTR. :—Evergreen forests along the Western ghats. This tree was formerly planted along the avenues and roads in N. Kanara by the Sonda Kings; Western India; also planted in the moister districts of Mysore; abundant in S. Kanara.

DESCR. OF WOOD :—*Colour*—sap-wood cream, heart-wood light-yellowish buff, darkening to pinkish buff on exposure. *Pores* large, often sub-divided, ringed. *Med. rays* fine and broad, very prominent on all vertical sections, while on a radial section they appear as rough plates with white fibres between them. The distance between the broad rays is generally greater than the transverse diameter of the pores. *An. rings* doubtful, though distinct. Interlocked grains in narrow bands and of medium texture, moderately strong, not very durable; seasons fairly well; cupping and warping is sometimes experienced; nice to work; takes a good polish. *Wt.*—36 lbs. per c.ft. (airdry).

USES :—Useful wood for boxes, packing cases, interior work in houses, and planking generally. It is used as a substitute for imported pine and deal woods. It is suitable for ply-wood work and has been used for match manufacture. Yields the piney gum-resin. Seeds yield a kind of tallow.

See—Oils, Gums and Resins.

VITEX ALTISSIMA Linn.

FAM.—Verbenaceæ.

COM. NS. :—K. Balgay, Burnige, Mairsle, Nauladi-mara, Naiel-mitik, Sampaga-pale; M. Banalgay.

CHAR. :—A very large tree with a dense head and somewhat drooping branches. *Bark* yellowish-grey, fibrous, scaly. Branchlets quadrangular, compressed and channelled. *L.*—3, rarely digitately 5-foliate, leaflets 7·5-15 × 2·5-6·3 cm., sessile, oblong-elliptic, acute or acuminate, sub-coriaceous, entire, slightly pubescent or glabrescent above, clothed with white tomentum beneath. *Fl.*—tinged with blue, in panicles composed of numerous interrupted cymes or spikes. Corolla small, lower lip hairy. *Fr.*—drupe, size of a pea, fleshy, black. *Fl. t.*—May. *Fr. t.*—June-July.

DISTR. :—In the evergreen forests of the Konkan and N. Kanara; abundant in the Kumta and Yellapur taluka forests, Bengal, Southern and Western India; Ceylon.

DESCR. OF WOOD :—*Colour* grey with a tinge of olive-brown. Close-grained. *An. rings* distinctly marked by a belt of firmer wood on the outer edge. *Pores* small, scanty. *Med. rays* fine, numerous,

wavy. Hard, durable and polishes well. Wt.—53 lbs. per c.ft. An excellent durable timber, much in demand in parts of N. Kanara (Talbot).

USES :—Wood used for buildings, construction of carts, well-construction ; has been tried for railway sleepers with very fair results ; suitable for trial for paving blocks. The wood is especially good for use under water (Foulkes).

VITEX LEUCOXYLON Linn.

FAM.—Verbenaceæ.

COM. NS. :—K. Hole-lakki, Karril, Senkani ; M. Shirus, Songarbi.

CHAR. :—A large deciduous tree with spreading branches ; trunk thick, short, 9-18 m. high ; girth 9-3.6 m. Bark grey, smooth, glabrous, except the young shoots which are minutely downy. L.—3-5-foliolate on a petiole 5-12.5 cm. long ; leaflets 5-12.5 × 2.5-7.5 cm., oblong or lanceolate-acuminate, usually entire, acute at the base, sub-coriaceous, shining above, pale, glabrous or finely downy beneath. Fl.—white, with the centre of the lower lip clothed with lilac hairs, numerous, fragrant, sessile on short pedicels in dichotomous, long, peduncled, axillary cymes. Calyx 5-toothed ; corolla twice the length of the calyx. Fr.—drupe, oval, size of a cherry, black, supported by the circular calyx. Fl. t.—Feb.-Apr. Fr. t.—during the rains. Sheds leaves in the hot season. A conspicuous and pretty tree.

DISTR. :—Throughout the Konkan and N. Kanara ghats, along the banks of rivers and nalas, in moist forests. Western Peninsula ; Ceylon.

DESCR. OF WOOD :—Colour light greyish-brown. Close-grained. Pores moderate-sized, often sub-divided, evenly distributed. Med. rays moderately broad, regular, with a silver-grain of narrow plates. Moderately hard, durable. Wt.—40 lbs. per c.ft.

USES :—Wood used for cart-wheels and deserves attention for furniture.

VITEX NEGUNDO Linn.

FAM.—Verbenaceæ.

COM. NS. :—E. Indian Privet ; G. Nigod, Nirgari ; H. Sambhalu ; K. Bilenekki, Lakki, Nirgundi, Nukki ; M. Nirgudi.

CHAR. :—A small evergreen shrub or a small tree, 4.5-6 m. high ; girth 6-9 m. Bark thin, grey. Young shoots, lower surface of leaves and inflorescence clothed with white tomentum. L.—3-5-foliolate on a 2.5 cm. petiole ; leaflets 2.5-10 cm. short, petiolulate, lanceolate, entire or coarsely-toothed. Fl.—small, bluish-white, in terminal thyrsi. Fr.—berry, size of a pea, black when ripe. Fl. t.—Mar.-May, also throughout the year.

DISTR. :—In waste lands and moist situations throughout the State ; very common along the banks of rivers. Konkan and Deccan. Throughout India. Sind, Ceylon, Afghanistan, Phillipine Islands.

DESCR. OF WOOD :—*Colour* greyish-white. *An. rings* marked by a narrow belt of numerous pores at the inner edge ; in the rest of the wood, the pores are small and moderate-sized, scanty. *Med. rays* numerous, fine, uniform, equidistant. Hard. *Wt.*—42 lbs. per c.ft.

USES :—Wood used as fuel, branches used for wattle work, hedges and rough baskets. Roots, leaves and fruits used medicinally.

It is an important plant for reafforestation.

See—Medicinal Plants.

WALSURA PISCIDIA Roxb.

FAM.—Meliaceæ.

COM. NS. :—No common names.

CHAR. :—A moderate-sized tree. *Bark* thin, greyish-brown (ash-coloured), tessellated in somewhat rectangular squares. *L.*—5-18 cm. long, alternate. Leaflets 1-4 by 1.7-3 cm., elliptic, obtuse often emarginate, glabrous, shining green above, pale beneath, on short petiolules. *Fl.*—numerous, small, yellowish-white, in small terminal panicles. Bracts minute, caducous. Calyx 5 cleft. Petals 5, imbricate. Staminal tube 10-divided, divisions all bifid. Ovary 2-rarely 3-celled. *Fr.*—berry, oblong, shortly tomentose, size of an olive, dark-brown, 1-celled, 1-seeded, indehiscent. *Fl. t.*—Nov.-Dec. *Fr. t.*—May-June.

DISTR. :—N. Kanara and Belgaum ghats in evergreen forests. Western Peninsula, on both sides, south of the Godavari river. Ceylon (dry regions).

DESCR. OF WOOD :—*Colour* sap-wood reddish-brown, heart-wood dark-red, much streaked with black. Close-grained. *Pores* small, clear, surrounded and joined together by wavy anastomosing concentric belts of light tissue. *Med. rays* very fine, clear and regularly distributed. Hard, heavy and strong. *Wt.*—59 lbs. per c.ft.

USES :—Wood used for various purposes in N. Kanara. Fruit pulp used to intoxicate fish. Bark contains much tannin.

See—Fish Poisons, Dyes and Tans.

WRIGHTIA TINCTORIA R. Br.

FAM.—Apocynaceæ.

COM. NS. :—G. Indrajav, Kali-kari ; H. Dudhi, Indrajav, Khirai ; K. Hale, Hallunova, Kod-murki, Kuda ; M. Indrajav, Kala-kuda.

CHAR. :—A small deciduous tree, 6-7.5 m. high, girth .9-1.2 m. *Bark* scaly, smooth. *L.*—7.5-10 × 2.5-4 cm., elliptic-oblong, acuminate, rounded at the base, entire, membranous, glabrous or occasionally pubescent, or with the margins slightly eroded ; petiole 2-3 lin. long. *Fl.*—white, fragrant, 1.3-2 cm. diam., in lax terminal cymes ; bracts lanceolate, caducous. Corolla-tube twice the length of calyx. Corona consisting of numerous white linear-scales. *Fr.*—

follicles, 25-50 cm. long by 5 lin. diam. *Fl. t.*—Mar.-May. *Fr. t.*—Jan.-Feb. Sheds leaves Feb.; new leaves Mar.-Apr.

DISTR. :—Throughout the State in deciduous forests. Konkan, Matheran, jungles south of Nagothana; Deccan, Khandala, Karla; S. M. Country, Badami. Common on the Toranmal plateau in W. Khandesh, Rajasthan, Madhya Pradesh, W. Peninsula: Ceylon.

DESCR. OF WOOD :—*Colour* white like ivory. Even-grained. *Pores* scanty, very small, in short radial lines. *Med. rays* extremely fine, numerous. Moderately hard. *Wt.*—49 lbs. per c.ft.

USES :—Wood is of good quality for carving and turning; used for combs, utensils, toys, yokes, bedsteads; also sometimes for building purposes. Bark and seeds used medicinally. Leaves yield a blue dye and a kind of indigo, and are used as wrappers for bidis. Leaves used as fodder for cattle.

See—Medicinal Plants, Dyes and Tans, Fodder Plants.

WRIGHTIA TOMENTOSA Roem. & Schult.

FAM.—Apocynaceæ.

COM. NS. :—*H.* Daira, Dharauli, Dudhi; K. Bile Kudegida, Kadu gangalu; M. Kala-indrajav, Tambda-kuda.

CHAR. :—A small deciduous tree, reaching 7·5-9 m. in height with 9-1·5 m. girth; abounding in yellow milky juice, with opposite divaricate branches. *Bark* 1·3 cm. thick, grey, corky. *L.*—7·5-10 × 4·5 cm., elliptic-acuminate, attenuated into a petiole, entire, membranous. *Fl.*—2·5 cm. diam., yellowish, on short pubescent pedicels forming a short, peduncled, terminal, corymbose cyme. Corolla-tube twice the length of the calyx. Corona orange-coloured and cleft into about ten scales. *Fr.*—follicles, 20-30 cm. × 1·3 cm. or more across, scabrous, with numerous elevated specks with a shallow furrow on each side. *Fl. t.*—Apr.-June. *Fr. t.*—Nov.-Jan. Sheds leaves Feb.-Mar.; new leaves Apr.-May.

DISTR. :—Throughout the State, common in the moist forests of the Konkan, rare in N. Kanara on the Supa ghats. Throughout India from the Indus eastwards and southwards to Ceylon: Burma, Penang.

DESCR. OF WOOD :—*Colour* white. Even-grained. *An. rings* marked by a pale line and occasionally more pores. *Pores* in the rest of the wood very small, in short radial groups, scanty. *Med. rays* very fine and extremely fine, very numerous, closely packed. Moderately hard. *Wt.*—40 lbs. per c.ft.

USES :—Wood is used for furniture, packing-cases, indigo-boxes, combs, picture-frames and for turning and carving into cups, plates, spoons, toys, etc.; a possible substitute for boxwood for engraving; was tried in pencil-manufacture. Yellow-milky juice from the bark mixed with water forms a good dye. It is said to be used for stopping bleeding by Nepalees. Tree is grown for ornament.

See—Dyes and Tans.

XYLIA DOLABRIFORMIS Benth.

FAM.—Mimosaceæ.

COM. NS. :—*E.* Iron Wood tree of Pegu and Arakan ; *H.* Jambu ; *K.* Jambe, Tirawa ; *M.* Jambha, Suria, Yerul ; *Tr.* Irul.

CHAR. :—A large deciduous tree, 15-18 m. (sometimes 30 m.) high ; girth 2·6-3·6 m. *Bark* grey or reddish-brown, with short cracks irregularly distributed, scaling off in great thick irregular patches. *L.*—bipinnate, pinnae 2 ; leaflets 4-10, opposite, oblong, acute, sub-coriaceous, 7·5-15 cm. long, the terminal leaflet much larger. *Fl.*—yellowish, sessile, in dense peduncled heads, crowded on 2·5-5 cm. long peduncles arising from above the scars of the fallen leaves. Corolla small. Stamens 10. *Fr.*—pod, woody, falcate, flat, greyish-brown, 10-15 × 2·5-6·3 cm., 6-10 seeded. *Fl. t.*—Mar.-Apr. *Fr. t.*—Oct.-Nov. Sheds leaves during hot season.

DISTR. :—Throughout the deciduous forests from Kolaba district to Savantwadi ; Madhya Pradesh, South India ; Burma, Singapore and the Philippines.

DESCR. OF WOOD :—Sap-wood small, heart-wood dark-brown or reddish-brown. Cross-grained, the fibres on a longitudinal section being heavy. *An. rings* indistinct. *Pores* large and moderate-sized, filled with resin, often sub-divided into numerous compartments, and then oval or oblong, the groups in irregular patches of loose tissue which are often arranged in oblique lines. *Med. rays* fine, very numerous undulating. Extremely hard ; difficult wood to season, tough, strong, fairly durable ; not very easy to work. Average *Wt.*—60 lbs. per c.ft.

USES :—Wood used for house-building, bridge-construction, telegraph poles, railway sleepers, bolsters for timber-trucks, bogie-frames and other purposes in railway waggon construction, tent-pegs, railway-keys, well-construction, boats and their parts, carts and their parts, oil-presses ; used for paving blocks in Rangoon with excellent result. The wood is said to give a good tanning extract.

See—Dyes and Tans.

ZIZYPHUS GLABERRIMA Santapau.

FAM.—Rhamnaceæ.

COM. NS. :—The same as *Z. xylopyra* Willd.

CHAR. :—A small tree, erect up to 4 m. high, mostly very sparsely armed, not rarely either completely unarmed or on the contrary armed with many thorns. Branchlets pubescent when young, older ones glabrous. *L.*—acute, sub-acute, obtuse or even slightly emarginate, 3-nerved from the base (nerves not converging towards the apex), base acute or rounded or very unequal, completely glabrous or at most sparsely pubescent on the primary nerves beneath, the margins irregularly denticulate ; petiole tomentose. Stipules 2 for each leaf, filiform, caducous. *Fl.*—generally pentamerous, pale green in colour. Calyx and corolla as in typical *Z. xylopyra*. *Fr.*—at first green, at length greyish-brown or black, glabrous, globose, pericarp woody or sub-woody. Seeds orbicular,

DISTR. :—Common along the Western Ghats near Bombay ; Saurashtra, at the foot of the Girnar near Junagadh.

DESCR. OF WOOD :—The same as *Z. xylopyra* Willd.

USES :—The same as *Z. xylopyra* Willd.

ZIZYPHUS MAURITIANA Lamk.

(*ZIZYPHUS JUJUBA* Lamk.)

FAM.—Rhamnaceæ.

COM. NS. :—*E.* Chinese Date, Indian Cherry-plum ; *G.* Ber, Bordi, Boyedi ; *H.* Ber, Beri ; *K.* Bogari, Bore, Ilanji ; *M.* Bor.

CHAR. :—A small sub-deciduous tree with dense spreading crown, about 6 m. high, (sometimes 7.5-10 m. high), girth 1.2-2.4 m. *Bark* dark grey, rough, deeply furrowed. Branches armed with spines in pairs, one straight, the other curved. *L.*—alternate, oblong or ovate, minutely serrulate, apex toothed, base oblique nerved, upper surface shining, buff-tomentose beneath. *Fl.*—in dense axillary cymes or fascicles, greenish. *Fr.*—drupe, 1.8-1.7 cm. diam., globose, first yellow, then orange and finally reddish brown ; seed one, hard. *Fl. t.*—Mar.-June. *Fr. t.*—Nov.-Jan.

DISTR. :—Throughout the State in dry situations, open dry forests, on poor soils and in rocky places ; abundant in the Deccan ; on the laterite near the sea-coast in N. Kanara. Indigenous and naturalised throughout India, in the outer Himalayas up to 1,400m. : Burma, Ceylon, China, Afghanistan, Africa, Australia.

DESCR. OF WOOD :—*Colour* reddish ; no heart-wood. *An. rings* indistinct. *Pores* small or moderate-sized, scanty, often oval or sub-divided. *Med. rays* fine, very numerous, uniform and equidistant ; the distance between two rays much less than the transverse diameter of the pores. *Pores* frequently joined by short fine concentric lines. Hard ; polishes well. *Wt.*—48 lbs. per c.ft.

USES :—Wood used for agricultural implements, oil-mills, etc. *Bark*, leaves, flowers and fruit used medicinally. Fruit edible. Leaves used also as fodder. Bark contains tannin.

See—Medicinal Plants, Fruit Trees, Fodder Plants, Dyes and Tans.

ZIZYPHUS TRINERVIA Roxb.

FAM.—Rhamnaceæ.

COM. NS. :—No common names.

CHAR. :—A small unarmed tree ; shoots and inflorescence pubescent. *L.*—coriaceous, glabrous, ovate, acute, mucronate, finely serrate, 3-nerved, 2.5-6.5 × 1.6-2.5 cm. *Fl.*—small, yellow, in axillary congested cymes., about 1.34 cm. long ; sepals triangular, keeled within ; petals obovate, truncate at the tip. Ovary 2-celled. *Fr.*—globose or obovoid, rugose yellowish, 1.2-seeded, pulp sweet, gelatinous. *Fl. t.*—Nov.-Dec.

DISTR. :—Rather rare in the State. Gujarat, Surat, Ahmedabad, Western Peninsula, Nilgiris, Mysore.

DESCR. OF WOOD :—*Colour* olive brown. Close-grained. *Pores* moderate-sized, often sub-divided, evenly distributed. *Med. rays* fine, white, distinct; occasionally fine concentric lines. Smooth, hard. Wt.—40 lbs. per c.ft. (Gamble).

USES :—Not known.

ZIZYPHUS XYLOPYRA Willd.

FAM.—Rhamnaceæ.

COM. NS. :—*H.* Chittania, Ghout, Kat-ber, Sitaber; *K.* Challe, Mulla-kara; *M.* Ghat-bori, Kanta-gotti, Gutti.

CHAR. :—A small tree, 4·5-6 m. high, girth 6·9 m. *Bark* grey or reddish-brown, with thick oblong exfoliating scales. Branches, underside of leaves, inflorescence and fruit covered with short greyish tomentum; stipulary thorns generally twin, one straight and the other recurved, always present in a poor soil, but often absent in a good one, and especially on younger branches. *L.*—4·8-1 cm. long and nearly as broad, elliptic orbicular or obovate, obtuse at the apex, slightly oblique, rounded or sub-cordate at the base, serrulate, glabrous and dark above, pale and softly pubescent below, shortly petioled. *Fl.*—greenish-yellow, sometimes tetramerous, on short pedunculate compact cymes. Calyx glabrous within; lobes keeled near the apex. Petals very concave, reflexed, on long claws. Disc thin, 5-angled. Ovary 3, rarely 2- or 4-celled. Styles usually 3, divided to near the base. *Fr.*—drupe, usually round, hard, 3-, rarely 2- or 4-celled, 1·3-2·5 cm. long, covered with a dense grey or whitish tomentum. *Fl. t.*—Apr.-May. *Fr. t.*—Sept.-Feb. New leaves Apr.-May.

DISTR. :—Common in the moist forests of N. Kanara and Konkan southwards in Western Peninsula. N. W. India, Rajasthan, Madhya Pradesh, Bihar and Oudh; Ceylon, Burma.

DESCR. OF WOOD :—*Colour* reddish or yellowish-brown with a small dark-coloured centre. *Pores* small and moderate-sized, in patches of soft tissue, which are often confluent, forming oblique bands. *Med. rays* fine, equidistant, very numerous, the distance between the rays less than the transverse diameter of the pores. *An. rings* not prominent. Hard, tough and durable. Wt.—50-60 lbs. per c.ft.

USES :—Wood used for inferior buildings, carts and their parts, agricultural implements, handles of hoes, axes, etc. and turning. One of the chief uses, however, is for the propagation of lac. It is a useful tree for clothing certain types of poor dry ground or clay soil where little else will grow.

APPENDIX I

Abbreviations used.

Apr.—April.
 An.—Annual.
 Aug.—August.
 c. ft.—Cubic feet.
 CHAR.—Character.
 cm.—Centimeter.
 COM. NS.—Common Names.
 Dec.—December.
 DESCR.—Description.
 Dist.—District.
 DISTR.—Distribution.
 E.—English.
 Fam.—Family.
 Feb.—February.
 Fl.—Flower.
 Fl. t.—Flowering time.
 Fr.—Fruit.
 Fr. t.—Fruiting time.
 G.—Gujarathi.

H.—Hindi.
 Jan.—January.
 K.—Kannad.
 L.—Leaves.
 Lin.—Line.
 M.—Marathi.
 m.—Meter.
 Mar.—March.
 Med.—Medullary.
 N.—North.
 Nov.—November.
 Oct.—October.
 S.—South.
 Sep.—September.
 S. M.—Southern Maratha.
 Tr.—Trade-name.
 Var.—Variety.
 W.—West.
 Wt.—Weight.



सत्यमेव जयते

APPENDIX II.

Glossary of Technical Terms.

Accrescent—increasing in size with age.
Achene—a small, hard, dry, indehiscent fruit of one carpel.

Acorn—the fruit of the oak.

Acuminate—having a gradually diminishing point.

Acute—sharply pointed.

Adnate—attached the whole length.

Adpressed—pressed close to, as hairs on stems, lying flat for the whole length of the organ.

Aestivation—the manner in which the parts of the flower are folded up before expansion.

Amentum—a spike of flowers usually with bracts and frequently deciduous; a catkin.

Amplexicaul—stem-clasping.

Anastomose—communicate or run into each other.

Androgynous—hermaphrodite, having male and female flowers on the same inflorescence.

Androphore—a support of a column of stamens.

Annual-Ring—the marks seen on a cross-section of wood which show the respective increment during each year.

Annular—used of any organs disposed in circle.

Anther—a part of stamen containing pollen grains.

Antheriferous—anther-bearing.

Anthocarpous—pertaining to fruits composed of flowers and fruit proper blended into a mass, as in pineapple.

Apex—tip.

Apiculate—furnished with a sharp, short but not stiff point.

Approximated—drawn close together but not united.

Aril—an expansion of funicle (thread connecting the ovule to the placenta), arising from placenta, and enveloping the seed.

Arillus—same as aril.

Articular—jointed.

Auricle—a small lobe or ear, an appendage in the leaf.

Awn—a bristlelike appendage occurring on the glumes of grasses.

Axillary—situated in the axil (the angle formed between the axis and any organ which arises from it).

Bast—fibrous tissue serving for mechanical support.

Bifoliate—two-leaved.

Bilabiate—divided into two lips.

Binate—a simple leaf divided into two; a leaf composed of two leaflets at the end of a common petiole.

Bisexual—having two sexes.

Bloom—white waxy covering on many fruits and leaves.

Bract—a modified leaf intermediate between the calyx and the normal leaf.

Bracteate—provided with bracts.

Bracteole—a small bract.

Buttressed—having knee-like growths of trunks or roots.

Caducous—dropping off early.

Callosity—a leathery or hard thickening of part of an organ.

Calyptra—cap-like covering of a flower or fruit.

Calyptrate—bearing calyptra.

Calyx—the outermost of the floral envelopes.

Campanulate—bell-shaped.

Capitate—pin-headed.

Capsule—a dry dehiscent fruit.

Cariopsis—a one celled, one seeded, superior fruit with pericarp united to the seed.

Carpel—a single pistil—answering to a single leaf.

Catkin—a deciduous spike, consisting of unisexual apetalous flowers.

Caudate—tailed.

Channelled—hollowed out like a gutter.

Chartaceous—papery.

Ciliate—fringed with hairs.

Cinereous—the grey of wood ashes.

Clavate—club-shaped.

Claw—the narrowed base of the petals.

Cocci—parts of a lobed fruit.

Cohering—incorporating one part with another.

Concave—hollow, as the inside of a saucer.

Conchoidal—having convex elevations and concave depressions like shells.

Cone—the fruit of the pine or fir tree.

Connascent—growing together.

Connate—united.

Connective—a portion of a stamen distinct from the filament which connects the two lobes of an anther.

Contorted—twisted or bent.

Convolute—coiled laterally upon itself, as a leaf in the bud.

Cordate—heart-shaped.

Coriaceous—leathery.

Corolla—the interior part of flower composed of petals.

Corona—crown-like part.

Corrugated—wrinkled.

Corymb—a flat-topped or merely convex and open flower-cluster of the intermediate order.

Corymbiform—arranged in corymbs.

Costa—a rib, when single, a mid-rib or middle-nerve.

Cotyledon—the first leaves of the embryo.

Crenate—toothed with rounded notch on the margin of a leaf.
Crenulate—crenate but with small toothings.
Crustaceous—of brittle texture.
Cucullate—hood-shaped or hooded.
Cuneate—wedge-shaped.
Cupular—furnished with cup-shaped structure.
Cuspidate—tipped with a sharp, rigid point.
Cymose—bearing a flower-cluster of centrifugal type especially broad and flattened one.
Deciduous—falling in season (as leaves in autumn).
Deflexed—bent outwards.
Dehiscent—splitting into definite parts.
Deltoid—shaped like an equilateral triangle.
Denticulate—minutely toothed.
Dichotomous—dividing by pairs from top to bottom.
Didymous—growing double.
Digitate—branching into divisions like fingers.
Dimorphic—occurring under two forms.
Diocious—unisexual, the male and female elements in different individuals.
Disc—development of that portion of the axis on which the parts of the flowers are inserted, within the calyx or within the corolla and stamens.
Distichous—disposed in two vertical ranks.
Divaricate—extremely divergent.
Divergent—separating by degrees.
Dorsifixed—fixed on the back or by the back.
Downy—with fine soft hairs.
Drupe—a fruit with fleshy outer covering and stony part inside.
Ebracteate—without bracts.
Echeloned—arranged in parallel lines, each line being to the left or right of the preceding one.
Echinate—prickly.
Elliptic—shaped like an ellipse.
Emarginate—having a notch cut out, usually at the extremity.
Endocarp—inner layer of the pericarp.
Ensiform—sword-shaped.
Entire—with even margin, without divisions.
Epicalyx—a ring of bracts resembling an accessory calyx.
Exarillate—without an aril.
Exfoliation—peeling off.
Falcate—sickle-shaped.
Farinaceous—of the nature of starch, containing starch; powdery.
Fascicle—a close cluster or bundle of flowers, leaves, stems or roots.
Ferrugineous—rust-coloured.
Filiform—thread-like.
Fimbriate—with the margin bordered by long slender processes.
Flagellum—runner, any basal branch disposed to root.
Flake—a loose scale-like mass,

Fluted—having furrows.
Foetid—having an offensive smell.
Follicle—a fruit of one carpel opening by the inner-face suture to which the seeds are attached.
Foveolate—marked with small pitting.
Furfuraceous—having soft scales.
Fusiform—spindle-shaped.
Glabrescent—becoming smooth or slightly so.
Glabrous—smooth, without pubescence.
Glandular—consisting of glands.
Glaucous—becoming sea-green.
Glaucous—sea-green; covered with a bloom as cabbage-leaf.
Glomerate—collected into heads.
Gonous—angled.
Gregarious—growing in company.
Gynophore—the stalk on which the ovary stands in certain flowers.
Hastate—spear-shaped.
Heart-wood—the innermost and the oldest wood next to the pith.
Hermaphrodite—having both sexes in the same flower.
Hilum—the scar left on a seed where formerly attached to the placenta.
Hirsute—hairy, with long, tolerably distinct hairs.
Hoary—grey from fine pubescence.
Hypogynous—free from but inserted beneath the pistil (the female organ).
Imbricate—overlapping as tiles on the roof.
Imparipinnate—pinnate with an odd terminal leaf.
Indehiscent—not opening along regular lines.
Inflorescence—disposition of the flowers on the floral axis; less correctly used for flower-cluster.
Infra-axillary—below the axil.
Infra-petiolary—below the petiole.
Infundibuliform—funnel-shaped.
Innovation—a newly formed shoot which becomes independent from the parent stem by dying off behind.
Internode—a portion of the stem between two nodes.
Intramarginal—placed within the margin near the edge.
Introrse—turned inwards, towards the axis.
Involucre—ring of bracts, surrounding several flowers or their supports.
Involute—having the edges of the leaves rolled inwards.
Keel—a ridge like the keel of a boat; the two anterior and united petals of papilionaceous corolla.
Laciniate—cut into narrow lobes.
Lanceolate—narrow, tapering to each end.
Legume—a seed-vessel of two valves; a pod.
Lenticel—a corky spot on young bark.
Lenticillate—having lenticels.
Lepidote—beset with small scurfy scales.

Ligulate—having ligulæ.

Ligule—a thin scarious projection from the top of leaf-sheath in grasses; strap-shaped body such as limb of a ray floret.

Linear—narrow.

Loculicidal—cavity of a pericarp dehiscent by the back, the dorsal suture.

Lozenge-shaped—like a figure with four equal sides having two acute and two obtuse angles.

Lucid—shining, referring to the surface.

Mamillate—having teat-shaped processes.

Mealy—powdery.

Medullary rays—plates of cellular tissue radiating from the pith to the cortex (the bark or rind).

Membranous—having thin flexible texture.

Monandrous—with one stamen.

Monodelphous—with one stamen, all stamens joined together and forming one staminal bundle.

Moniliform—having contractions at regular intervals.

Monœceous—having male and female flowers on the same plant.

Mucro—a sharp terminal point.

Mucronate—possessing a short and straight point.

Multiseriate—in several rows.

Muricated—with short and hard tubercular outgrowths.

Node—the part of the stem to which the leaf is normally attached.

Nut—a hard and non-splitting, one-seeded fruit.

Obcordate—inversely heart-shaped.

Oblique—of unequal sides.

Oblong—much longer than broad.

Obovate—reversed ovate, the distal end the broader.

Obovoide—an obovate solid.

Obsolete—wanting or rudimentary.

Obtuse—blunt or rounded at the end.

Orbicular—of a flat body with a circular outline.

Ovary—the immature fruit containing ovules.

Ovate—shaped like a longitudinal section of a hen's egg.

Ovoid—an egg-shaped solid.

Ovule—the young seed in the ovary.

Palmate—shaped like a palm of hand.

Panicle—a loose flower-cluster.

Paniculate—having panicles.

Parenchyma—tissue composed of cells having equal dimensions.

Paripinnate—a compound pinnate leaf ending in two leaflets.

Patent—spreading.

Pedicel—an ultimate flower stalk, support of a single flower.

Pedunculate—furnished with a foot-stalk.

Pellucid—wholly or partially transparent.

Pellucid-dotted—having pellucid dots.

Pentadelphous—with five bundles of stamens.

Pentamerous—with parts in fives.

Peltate—a leaf attached by the lower surface to the stalk.

Penninerved—pinnately veined.

Perianth—the floral envelopes.

Pericarp—the wall of the fruitified ovary.

Petal—one of the leafy expansions in the corolla.

Petaloid—like a petal.

Petiole—foot-stalk of a leaf.

Petioluled—having small petiole.

Pilose—hairy.

Pinnæ—primary divisions of a pinnate leaf, the leaflets.

Pinnate—with leaflets arranged each side of a common petiole.

Pinnatifid—pinnately cleft.

Pinnule—a secondary pinna.

Plano-convex—flat on one side and convex on the other.

Plicate—folded into plaits.

Polygamous—with hermaphrodite and unisexual flowers on the same or different individuals of the same species.

Pore—any small aperture.

Præmorse—as though the end were bitten off.

Puberulous—slightly hairy.

Pubescent—clothed with soft hair.

Pyrene—a small stone of a drupe or similar fruit.

Pyriform—resembling a pear in form.

Raceme—an indeterminate inflorescence with lengthened axis and equally pedicellate flowers.

Rachis—axis of an inflorescence or a compound leaf.

Radicle—the rudimentary root of an embryo.

Receptacle—that portion of the axis on which the parts of the flower are inserted.

Reniform—kidney-shaped.

Repand—with slightly uneven margin.

Repand-toothed—toothed with slightly uneven margin.

Reticulate—like net-work.

Retuse—with a shallow notch at the rounded apex.

Revolvute—rolled backward or downwards.

Rhomboidal—quadrangular, with lateral angles obtuse.

Rhytidoma—the formation of plates of cellular tissue within the liber (inner bark).

Rotate—wheel-shaped.

Rotundate—rounded.

Rufous—reddish.

Rugose—wrinkled.

Rugulose—somewhat wrinkled.

Ruminant—looking as though chewed.

Saccate—bag-shaped.

Sagitate—enlarged at the base into two acute lobes.

Sap-wood—new wood arising from the superficial tissue.
Scabrid—somewhat rough.
Scabrous—rough to the touch.
Scurfy—scaly.
Semi-lunar—shaped like half-moon.
Sepal—each segment composing a calyx.
Septicidal—when a capsule opens through the lines of junction.
Serrate—notched on the edge like a saw.
Sessile—without stalk.
Setaceous—bristle-like.
Setulose—resembling a fine bristle.
Silver-grain—the appearance in radial longitudinal section of wood due to the shining plates of the medullary rays.
Sinuate—with a deep wavy margin.
Sinus—a recess or re-entering angle.
Spadix—a form of inflorescence (a spike with fleshy axis).
Spathe—a large membranous leaf-like structure at the base of spadix.
Spatheaceous—spathe-bearing.
Spathiform—having a spathe-like form.
Spathulate—oblong with the basal end narrowed like a druggist's spatula.
Spiciform—spike-like.
Spike—an indeterminate inflorescence with sessile flowers on a common elongated stalk.
Spikelet—a secondary spike; a cluster of one or more flowers subtended by a common pair of glumes.
Spur—a hollow and slender extension of some part of flower.
Staminode—sterile or abortive stamens.
Standard—the posterior petal of the papilionaceous corolla.
Stellate—star-like.
Stigma—that part of the style which receives the pollen.
Stipale—a minute stipule.
Stipitate—having a special stalk.
Stipule—appendages of a leaf on each side of the leaf-attachment.
Striate—marked with fine longitudinal parallel lines, as groves or ridges.
Strigose—beset with sharp pointed, straight, stiff hairs.
Style—narrow part of the carpel between the ovary and the stigma.
Subsessile—almost devoid of stalk.
Suborbicular—nearly circular.
Subquadrate—a quadrat of 1 to 8 decimeters.

Subulate—awl-shaped.
Succulent—fleshy or juicy.
Superposed—vertically over some other part.
Supra-axillary—growing above an axil.
Tassellated—adorned with tassels.
Tawny—dull brownish yellow.
Teret—circular in transverse section.
Terminate—limited, bounded.
Ternate—in threes.
Tetracoeous—consisting of four closed carpels.
Tetramerous—of four members.
Thyrse—a mixed inflorescence, a contracted panicle, the main axis indeterminate but the secondary axes cymose.
Tomentose—softly hairy.
Torulose—cylindric with swollen portions at intervals.
Torus—that portion of the axis on which the parts of the flower are inserted.
Trapezoid—like a trapezium (unsymmetrical four-sided figure).
Trichotomous—branching or dividing by threes.
Trifoliate—three-leaved.
Trigonus—three-angled.
Tripinnae—thrice pinnate.
Truncate—as though cut off at the end.
Tubercule—wart-like outgrowth.
Tubulose—having the form of a tube.
Turbinate—shaped like a top.
Umbellet—a small umbel or a simple one.
Umbelled—having umbels (an inflorescence in which a cluster of pedicels spring from the same point like the ribs of an umbrella).
Umbilious—the hilum of a seed.
Undulate—wavy.
Unguiculate—having claws.
Unisexual—having one sex.
Urceolate—pitcher-like.
Urn-shaped—pitcher-like.
Ventricose—inflated on one side.
Venule—vein of secondary importance.
Verrucose—full of warts.
Versatile—turning freely on its support.
Verticillate—whorled (having circular arrangement of similar parts round an axis).
Villous—having long weak hairs.
Warted—having hard or firm outgrowths.
Whorl—the arrangement of organs round an axis.
Whorled—disposed in one or more whorls.

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